TEXTILES PAPER LEATHER

AMERICAN DYESTUFF REPORTER

Including the Proceedings of the
AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

VOLUME XI OCTOBER 9, 1922 NUMBER 8

FEATURES OF THIS ISSUE

Under the general heading "American-Made Colors," The Reporter presents the first installment of a classified list of American dyes, their manufacturers, and their trade names. This issue contains Group I, Acid Colors.

In "The Merchandising of Dyestuffs," Alan B. Claflin distinguishes between merchandising and selling, discusses efficiency in distribution, and enters a plea for co-operation.

Raffaele Sansone furnishes Part III of his "Notes on the Dyeing of Direct Blacks on Cotton Piece Goods."

This issue marks the Fifth Anniversary of The American Dyestuff Reporter. See page 291.

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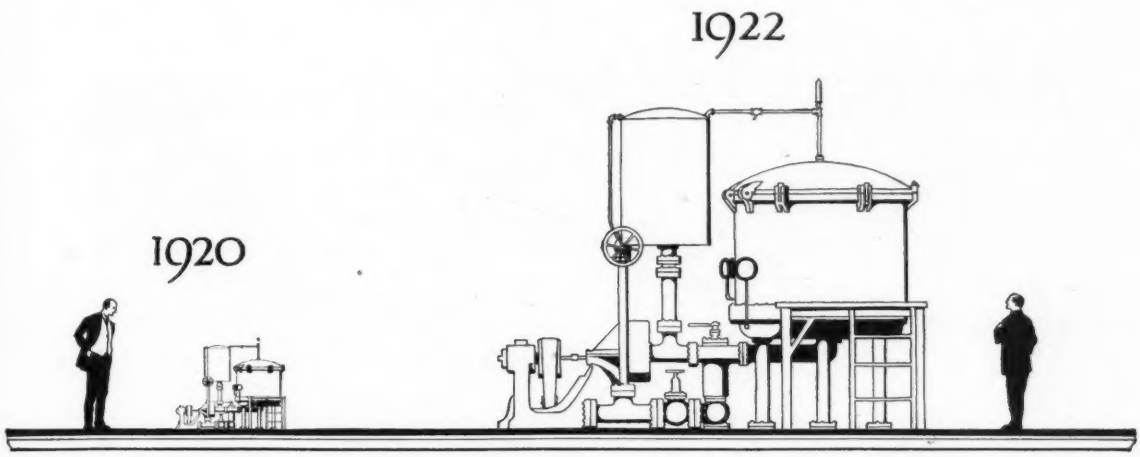

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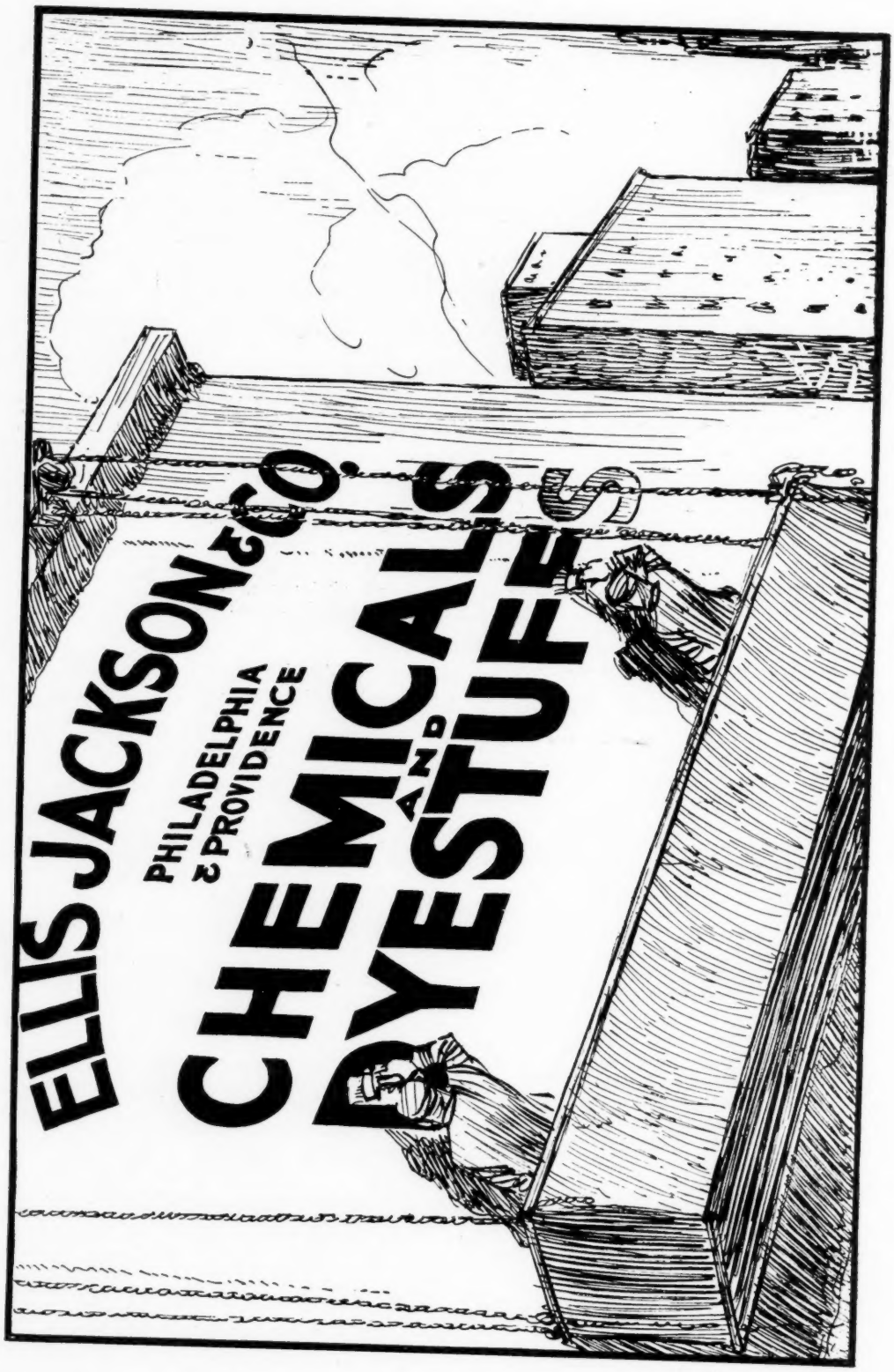
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OF INTEREST TO DYERS AND THE COLOR USING INDUSTRIES IN GENERAL

Prepared by the

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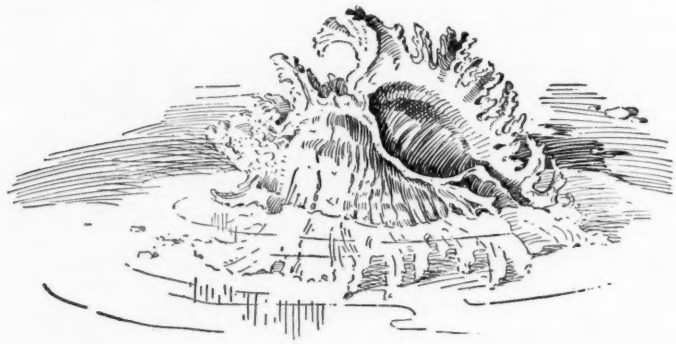

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VOLUME XI NEW YORK, OCTOBER 9, 1922 NUMBER 8

The Merchandising of Dyestuffs

Definition of Merchandising—Selling as a Career—Distribution of Dyestuffs—Increasing Efficiency—Census of Consumption Needed—Value of Statistics as a Barometer—Standardization of Shades—Sales Engineering—Aimless Interviews—A Plea for Collaboration

By ALAN B. CLAFLIN

L. B. Fortner Company, Boston, Mass.

THE merchandising of dyestuffs gives rise to problems of importance secondary only to the actual production of the dyestuffs. Indeed, it is probable that more money has been lost, and will continue to be lost, through inability to solve these problems than through inability to solve the technical problems of color manufacture. Despite a fairly general recognition of the importance of these merchandising problems, there has been little public discussion of the subject; this is primarily because there is little enlightenment any one individual may give; and, further, if an individual did or does possess superknowledge, it is infinitely more profitable for him to apply his knowledge rather than to talk about it.

On the other hand, when a subject is of widespread interest it is likely that a general consideration of it, while it may contribute nothing specific to the individual reader, may initiate a line of thought of very material benefit.

Definition of Merchandising

As a beginning, let us point out the distinction, perhaps arbitrary, we make between merchandising and selling, and why the simpler term was not selected as a title.

Merchandising is more comprehensive; it includes the whole subject of the distribution of dyestuffs from the factory to the consumer, buying as well as selling. In the merchandising of any commodity there arise problems that are common to all commodities; then, there are problems that are common to commodities of a certain class, and then there are problems that in their nature are specific.

So far as the present discussion is concerned, the endeavor will be made to confine the observations to the problems pertinent to dyestuffs and leave to the semiscientific and pseudoscientific writers, who supply the voluminous treatises on psychology applied to business, those problems which are common to all varieties of merchandising.

Selling as a Career

In general—and this is much to be regretted—there has been, or still exists, a feeling that selling is not quite so lofty or intellectual a pursuit as one of the professions or manufacturing. Just as to the children of the mechanic is the instinctive yearning for the white-collar job, so to the average graduate of the scientific or technical course there is apt to be a slight feeling of aversion to using his education as an assistance in the selling or distribution of a technical commodity.

Undoubtedly this feeling of aversion to a career of selling, which, fortunately, is much less general than it was a few decades ago, is a survival of the medieval contempt for all matters pertaining to trade, and is one reason why improvement of distribution methods has lagged so much behind the improvement of production. Too often and too much is the consumer penalized because production of the twentieth century is harnessed to a distribution system but little if any advanced over the early nineteenth or even eighteenth century.

Efficiency of Distribution

In speaking of distribution let us emphasize what is meant is the whole system by which a commodity passes from the hands of the maker to those of the consumer rather than the mere mechanical means, and a method of distribution which includes motor-truck or airplane carriage may be really little, if any, advance

over the saddlebag of the colonist. The efficiency of a distribution system must be measured by its relation to, or percentage of, the cost. It is, however, well to recognize that a system may, and usually does, distribute service as well as merchandise, and that in considering whether distribution is efficient or not due regard must be given that what proportion is paid merely for the product and what is paid for service. It should further be emphasized that in the last analysis all costs are ultimately paid by the consumer. On the whole—and in making this statement full consideration is given the great co-operative supply agencies of England—progress in distribution has been more indebted to American initiative than to any other source.

Distribution of Dyestuffs

From its complex nature, and because it involved a transition from centuries-old custom, from its inception the distribution of synthetic dyes has included a very heavy (proportionally) service charge. What the textile manufacturer is interested in is not the dyestuff *per se,* but the color it produces on his fabric. Therefore he must expect to pay, and does pay, a greater distribution cost for a dyestuff that merely requires dissolving in water to become applicable to his fabric than he paid when he bought raw dyewood logs and had to chip them, age the chips, extract them, and then apply this dye liquor with the aid of mordants and spirits that his dyer had made with processes and labor equal or greater than that required for the preparation of the dyewood. While the coal-tar industry had its beginning in England, its development soon passed into German control, and this German control was established, fostered and extended chiefly because of German recognition that the merchandising involved service as well as selling. Since, and because of, the Great War America has developed a dyestuff industry of its own. Whether this industry will be permanent or not depends on the ability with which the merchandising problems are handled, as well as that of handling the production problems.

Increasing Efficiency

In attempting to increase the efficiency of any process, the first endeavor should be to cut out waste. As a means of cutting out waste, a typical American method is that of standardization. Standardization is, however, a two-edged weapon, and should be employed only after the most serious consideration; while it saves, it destroys initiative, individuality and imagination. A factory can make mechanically better rugs than a Bedouin and can make them with infinitely less human effort, but that does not mean they will command a higher price in the markets of the world. When the psychology of style becomes an exact science, then may colors became standardized; but for the time being it is well to recognize there is a difference between the number of threads to the inch on a bolt and the shades madame may wear on her bonnet or hosiery. A person familiar with any phase of the dyestuff industry in America is, however, impressed with one waste that should be preventable; namely, the amortization charge that someone must assume for obsolete dyestuffs. American consumers of dyestuffs have, in the main, wisely appreciated that an American industry was as much an asset to them as to the investors who promoted it; but lack of free discussion of its problems has led to an optimistic feeling, characteristic of all classes of consumers, that losses are always borne by the producer. A far better attitude than a blind faith that the losses will fall on the other fellow is a spirit of co-operation to avoid preventable waste. Inherently there is a great hazard of obsolescence in dyestuffs; one does not have to own a stock of brown derbies—or "bowlers," to be understandable to our British friends—to know that "style is a fickle jade," and the quantity and kind of dyestuff consumed is largely dependent on style.

A Census of Consumption Needed

A reasonably comprehensive and reasonably accurate census of dyestuff consumption would save, however, a great deal of money to manufacturers as a whole. Of course, there are difficulties in its preparation. First, it would have to be compiled by someone who knew the names, synonyms and pseudonyms under which dyestuffs may be marketed. Further, it must be classified so the information, while sufficiently specific to be of value, shall not be so detailed as to make injudicious disclosures. The narrow merchandiser may feel that he would lose more than he would gain by a census of dyestuff consumption; may be apprehensive that the fact he is getting more than his share of the acid-black business will become known and stimulate his competitors. But perhaps he is not getting more than his share anyway; and will he not have equal chances of being stimulated by seeing the business he is not getting, or equally warned when he is getting too much?

Statistics a Barometer

It is not so much in mere statistical information as to quantities themselves, but as to tendencies, that a census would have value. The most expensive obsolescence of a dyestuff is not the apparent or temporary kind due to mere overproduction, but true obsolescence where the dyestuff has really ceased to be a commodity of value because it has been replaced by a better dye. Everyone knows now that the tendency is toward better and better dyes; this wasn't always so, as Arthur C. Green, distinguished inventor of Primuline, testi-

fied recently when he told dyers of the permanent shades it would produce. Their answer was: "Who wants permanent colors? The more permanent the color the less work for the dyer." A quarterly bulletin would show the demand for better quality was being tempered by inability to pay higher prices. As a thermometer in his radiator tells the motorist how his engine is running, so a bulletin giving the facts of consumption would enable the dyestuff manufacturer to gauge the pulse of the trade and trim his manufacturing sails to suit his expectancy of sales.

Value of Independent Statistics

It is, of course, true that in the first instance published statistics will help the small manufacturer more than they will the large manufacturer or combination, because they will supply to the former something he has not got and the lack of which he feels, while to the latter it will merely be in addition to the statistical department he already runs or attempts to run. Some familiarity with statistical departments of large organizations leads to the belief that they are more imposing by their title than by the accuracy of their data. Assuming, however, that the big firm's statistical bureau is all the name implies, it is surely a detriment to have the smaller concern equally well informed. Distress sales, the misguided little fellow's only relief, hit the big manufacturers the hardest. The other little fellows are in different lines, but the concern that makes all is hit by every blow-up.

A census of production like the recent United States Government Census of Organic Intermediates, Dyestuffs and Synthetic Organic Compounds, while extremely valuable, does not have the same immediate commercial value as a less comprehensive but more frequently issued bulletin of consumption. From its nature, considerable time must elapse from the date the statistics are gathered until they are published; and with an industry which is as rapidly changing as the dyestuff industry, the more nearly current figures are the more valuable they are. Consumption statistics are freely available for the great staples as well as crop reports; why not for dyestuffs?

Standardization of Shades

How valuable the work of standardization of shades, like that undertaken by the National Color Card Association, now in its fourth year, will ultimately prove to be, is, as indicated earlier in this, debatable. Only to a degree may styles be forced; but for a good while it certainly has been true that if one based his color scheme on the gathering for the Grand Prix at Longchamps, it would be repeated two years hence at all similar gatherings in America. So the standardized color card is not so much a prediction as a distribution of past observations. With an ever greater and greater proportionate production of ready-to-wear clothes, the necessity of knowing styles farther in advance is felt and a standardized shade card certainly can be of assistance; but there is always the danger of limitation where what the public may want is variety. However great or little ultimate influence there may result from the standard shade card, one permanent beneficent effect is to be noted in the enterprise of large dyestuff makers providing shade cards demonstrating how the standard shades may be obtained.

While the exhibition of compound shades in color cards has been more or less frequent by foreign dyestuff firms when the shades selected were hit or miss, it did not strike the consumer with the same emphasis that what he is really interested in buying is not dyestuff but shades produced on the fabric. This cannot be too thoroughly drilled into the mind of the consumer, and with it the value to him of co-operating with the seller.

Sales Engineering a Factor

Sales engineering is a modern term to describe the selling effort whereby the seller uses technically trained men to actually assist the buyer. This effort is wasted unless the buyer provides a man equally familiar with the problem involved to listen and discuss the subject with the trained salesmen. No one who has not traveled as a sales engineer can appreciate how much information is gathered thereby. This information is valuable alike to the producer whose product he is selling and to the users of the product. While largely eradicated by the necessities of the dyestuff famine period of the war, there still persists in some mills a feeling of the danger of disclosing secrets if a technical selling man talks with the actual user of the dyes. In the first place, if there are any secrets—which is rather doubtful in this day and generation—the technical employee is far more competent to guard them than the clerk who may be designated as purchasing agent; and, in the second place, if the technical employee is not to be trusted to meet the trained selling man openly, he may almost surely be trusted to meet a less trained but more sinuous selling man surreptitiously.

Loss of Time in Aimless Interviews

A more general reason than lack of confidence in his own man, and a much better founded one for not permitting free contact between the tecnical selling man and the technical consuming man, is the waste of time of the latter, or apparent waste of time. As a matter of fact, the waste of time is more apparent than real, as the chemist, dyer, colorist, or whatever position the technical consuming man may have, gains a great deal of his education from traveling technical men. There is, however, unquestionably much real loss of time due

to lack of co-ordination between the technical consuming and selling men. There is no reason why the chemist or dyer who represents the technical side for the consumer of dyestuffs should not formally recognize the interviewing of traveling men as one of his duties and appoint certain hours of certain days for this duty. To some extent this is now done, but in such cases the appointed hours are more apt to be honored in the breach than in the observance. This is because, in the first place, the appointed hours are by no means adequate, and, in the second place, there has been no proper publicity given to them, so the man coming from a distance is reasonably advised.

Too Many Traveling Men

It goes without saying that there are too many traveling men, although probably not too many of sufficient caliber by education and experience for the real requirements of the job. There are too many men because so much of their time is wasted sitting around waiting for the august presence to give them audience, and too few of caliber because there is so much sitting around that the seller cannot afford to employ them. An arrangement of definite, convenient and duly advertised hours for consultation with the technical man of the buyer would save a great deal of time and money for both buyer and seller. The economy started, there is no reason why it should stop with merely arranging hours or, the refinement of that, of making definite appointments for interviews.

A Definite Program for Discussion

Without invoking the word "agenda," which was so much overworked at the Genoa Conference, much time could be saved by having definite subjects for consideration. The consumer must have pretty definite ideas of the shades he is to produce for the season and the requirements of fastness for the same. Let him state these at the first interview; at the second interview let the seller state definitely how much he will charge for producing these shades, submitting dyed or printed samples to substantiate his figures. It would be unfair to the seller to require him to submit with his bid for a shade the exact recipe, as the seller with the best laboratory and technical application equipment might thereby be doing work to have someone underbid him who did not have that expense; but he could have the option of stating his charge for shade or for bidding on constituent dyestuffs, or both. On the other hand, it may be said this program ignores or duplicates the work of the technical department of the consumer, which in the largest concerns is better qualified for the problems than the technical department of the seller. This is true, and in those instances where there is a superior technical organization on the part of the consumer it is to be expected that the technical services of the seller will be employed only as a supplement and check on the work of the consumer. The large organization has, however, a great many and a great variety of problems, and in proportion for its size the adequacy of its technical staff may easily be overestimated.

A Plea for Collaboration

However, in substance what is suggested is a plea for collaboration. There is a great deal of its done privately; opportunities crop up for it, incidentally, in the too many desultory interviews which are always taking place. But why not make the collaboration more open, more formal and more definite? Job dye houses cannot present their problems in the same manner as the mill that specializes in a few staples, but a little thought on the part of the buyer would avoid a great deal of the present hit-or-miss, buckshot prescription method of selling at present in vogue, and which in the final analysis is paid for by the ultimate consumer.

THE WEIGHTING OF SILK

In addition to increase in weight, it has been found that swelling of the fiber takes place on weighting, and to-day this is the more important result: in a heavily weighted black silk this can amount to 200 per cent. Piece weighting yearly becomes more important. The tin phosphate-silicate method is carried out as follows: The silk is slowly rotated in a centrifuge lined with hard rubber, treated with 30 deg. Be. solution of stannic chloride for one to two hours, wrung and then well washed. A 5 to 7 deg. Be. solution of sodium phosphate at 50 deg. Cent. is run on the fiber, which permanently fixes the tin hydroxide and at the same time gives the silk an increased affinity for stannic chloride. This process is repeated as often as necessary; the washed silk is then treated with 3 to 5 deg. Be. water glass solution at 50 deg. Cent., silicic acid is deposited, and a considerable increase in weight occurs. Finally, the fabric is soaped, soured, washed and dyed. By a single treatment an increase of 5 to 20 per cent is obtained; by repeated treatments 80 to 100 per cent. For black silk the dyeing and weighting are combined.—W. Keiper in Textilberichte, 1922, 3, 181, abstracted in Jnl. Textile Institute.

New York Section A. A. T. C. C.

The first fall meeting of the New York Section of the American Association of Textile Chemists and Colorists has been called for Friday evening, October 20, at the Hotel Pennsylvania, New York City. Secretary (pro tem) E. H. Killheffer requests that members make every effort to be present, as matters of importance are to be discussed, particularly those relating to the annual meeting of the Association, which, it is hoped, may be held this year in New York under the auspices of the New York Section.

Abstracts of A. C. S. Dye Division Papers—Fall Meeting

[Note—Only such abstracts as are deemed of immediate interest to REPORTER *readers are here given; the balance are listed for reference.]*

Use of Bichromates in Wool Dyeing (as Mordants)

WINTHROP C. DURFEE

Bichromates early used as mordants on wool when dyewoods benefited by oxidation were principal dyestuff.

Oxidation is not usually beneficial to synthetic mordant dyes: is generally injurious.

Synthetic mordant dyes as organic acids require suitable basic mordants. Bichromates furnish chromic acid peculiarly suited for absorption into wool fiber and conversion into basic chromes.

Basic chrome should be combined in fiber with weak organic acid. Tartrates suitable for source of organic acid.

Best results in mordanting require careful consideration of combining weights of reduced chrome.

Amount of chrome used as mordant should have as near as practical a weight adjusted to combining weight of quantity of dye to be used.

Chemical Control of Dyestuffs

WALTER M. SCOTT

Cheney Bros., South Manchester, Conn.

This paper, given in full in our last issue, presents a general discussion of various methods for estimating the strength of dyestuffs as follows:

1. Colorimetric comparison of standard dyestuff solutions, i. e., a solution of one dyestuff known as a standard for this type of color is matched against a solution of an unknown by the use of two Nessler tubes of 50 cc. capacity placed side by side and illuminated by a common light source. By calculating from the amount of dye in each solution, the strength of the unknown may be expressed in terms of the standard.

2. Titration of a solution of known strength of dyestuff with a standard solution of titanous chloride in an atmosphere of carbon dioxide. Again the strength of various samples in one color group must be calculated in terms of some one type known as the standard.

3. Determination of the percentage of nitrogen by the Kjeldahl method. When the dyestuff is a definite chemical identity, the actual strength of the sample may be calculated by comparing the percentage of nitrogen obtained, with the theoretical percentage of nitrogen based on the chemical formula. For example, Victoria Blue B, according to Schultz, has the formula $C_{33}H_{32}N_3Cl$, which indicates a theoretical nitrogen of 8.31 per cent. If a sample of Victoria Blue B shows a nitrogen content of 6 per cent, its strength in terms of theoretical would be 72.2 per cent.

4. Estimation of the inorganic salts which have been used in the standardization of the dyestuff. In a large majority of cases either sodium chloride or sodium sulphate is used for this purpose and in a few instances sodium phosphate. These salts may be quantitatively estimated by igniting the dyestuff until the organic matter is entirely burned off or at least thoroughly charred so that a clear colorless solution of the ash is obtained.

The application of the above methods of analysis to a typical acid, basic, and direct color, i. e., Orange 2, Victoria Blue B, and Chrysophenine, is shown by tables giving the results of the analyses of several samples of each type.

In connection with the materials used in dyeing there is such a great variety that it is only possible to discuss a few of the more common types. This paper gives an outline of the general methods of analysis used and also suggested specifications for the following: Acetic acid, sulphuric acid, ammonia, black iron liquor, commercial "nitrate" of iron, disodium phosphate, Glauber salt, common salt, and soap made from olive or red oil.

Dyeing as an Art

J. MERRITT MATTHEWS

Dyestuffs and methods of dyeing have long been employed by many nations as a means of art expression, principally for the production of decorative effects on wearing apparel. The early Eastern nations, such as the Indian, Chinese and Japanese, were especially prominent in this line of art work, although we also find a somewhat similar development of this form of art among the early incas of Peru. The early nations, in contradistinction to our own of the present day, nearly always incorporated their art work in the actual utilities of their everyday life, and as their clothes were the nearest thing to them, they employed their art in the decoration of the fabrics used for their wearing apparel. We are more inclined to make our art work distinct in itself and with little or no connec-

tion with the things we use and wear. To us an art object is generally something that is set aside or put in a museum or cabinet, or hung on the wall, and must not be desecrated by using it or wearing it.

Dyestuffs, of course, are the basis of color on fabric materials, and the technique of using dyestuffs as a medium of color expression lies in the various methods relating to the application of dyestuffs. Art dyeing has a somewhat different function from that of ordinary commercial dyeing in that it seeks to decorate a more or less limited piece of fabric with a design as an individual unit and usually adapted to a special purpose, instead of dyeing or printing or otherwise coloring an unlimited yardage of cloth in a uniform effect. The same character of difference almost exists in the painting of a picture and the painting of a fence. It is natural, therefore, to find that the methods of dyeing for the production of art work show considerable differences from those customarily employed in commercial dyeing. In the first place, art dyeing is done practically altogether by hand methods and the color is built up on the fabric in accordance with the imagination of the artist. This, therefore, implies that the methods of dyeing must be handled in an understanding way by a craftsman or artist who must be something more than a mere artisan.

The principal forms of dyeing employed in art work are the batik style, tied-and-dyed work, stenciling, block printing, spray dyeing and shaded dyeings. These are usually practised as distinct arts in themselves, as it is rare that we find on artist particularly adept in a number of these different styles, and besides, one style is suited for one form of expression and another style for another.

Art dyeing is by no means obsolete at the present time; if anything, it is becoming more and more practised both as a cultural art for itself and also as a medium of applying decorative effects to wearing apparel, draperies and various fabrics employed in interior decoration. It is a province that excites interest on the part of the general public in the matter of dyestuffs and dyeing and as such is well worth the cultivation and encouragement of our dyestuff manufacturers.

Laundering of Textiles

A. F. Shupp

1. Gross volume of business transacted; persons employed by; annual payroll.
2. Development of standard formulas for laundering cotton, linen, wool, silk and artificial silk fibers.
3. Effect of repeated laundering on cotton goods.
4. Discussion of the proper method for the use of low titer and high titer soaps.
5. Samples of textiles that have been improperly laundered.
6. Samples of textiles that have been poorly constructed.
7. American Institute of Laundering.

The Tinting of White Papers

W. C. Holmes

For the tinting of news print stock and of white papers of the lower grades the basic dyes are exceptionally well adapted.

The acid dyes are well qualified to serve the requirements of medium grade paper.

In the tinting of white papers of the best quality it is necessary to resort to colors of the pigment type. The ultramarines, indanthrene dyes and the recently developed phosphotungstic lake products are employed, of which classes of colors each affords relative advantages in various essential respects.

In the latter field none of the tinting materials available at present can be considered entirely satisfactory and it would appear probable that products of superior general excellence could be developed in other pigment types, of which the dyes derived from the anilids of beta-hydroxy-naphthoic aid are suggested as one of the more promising fields for investigation.

The Influence of Change in Concentration on the Absorption Spectra of Dyes

W. C. Holmes

A brief review of the literature on the subject is given.

An outline of the preliminary results obtained by varying the concentration of a large number of dyes over a wide range is presented, together with representative absorption curves illustrating various types of behavior.

The interpretation of results and their bearing upon the condition of dyes in solution is discussed.

The Relative Stability of Paper Colors to Bleach

W. C. Holmes

Eighty representative paper colors are classified in respect to their relative susceptibility to calcium hypochlorite as determined by laboratory dyeing tests in which the essential conditions of beater operation were duplicated.

In general, the superior stability of pigment colors to photochemical attack finds an analogy in a corresponding stability to bleach, but little or no agreement is found between the relative susceptibility of the soluble dyes to the action of light and of bleach.

From the point of view of coloring considerations it is preferable to eliminate residual bleach from the stock by washing rather than by the employment of anti-chlors.

An Outline of the History and Chemistry of the Important Natural Dyestuffs

David Wallace and Emil Lesser

This paper covers the history of natural colors as used in ancient times and the impetus given to the in-

dustry with the discovery of America with its source of valuable natural dyestuffs, particularly Logwood, Fustic, Hypernic and Quercitron Bark.

Mention is made of the history of the development of the use of these colors. The chemistry of natural dyestuffs presents an interesting and complex study. It received years of study by such men as Chevreul, Erdmann, Graebe, Kostanecki, Herzig and Perkin. Most of their work was done on Haematoxylin and Brazilin, the coloring principles of Logwood and Hypernic.

In this country, the work of Perkin has been thoroughly reviewed and extended in the search of a method for producing additional dyestuffs from natural sources.

The sources, chemistry and application of the abovementioned dyestuffs, along with Cutch, Turmeric and Gambier, are discussed.

A brief mention is made of the present status of the industry.

The Dangers of the Titanium Chloride Method for Determining the Strength of Dyes

EDWARD H. GAMBLE and ROBERT E. ROSE

The quantitative method, as described by Knecht, for the estimation of the quantity of dyestuff in a sample by means of titanous chloride, is one which is very valuable; however, it must be used with great discretion and a full understanding of the material being tested. The method is sensitive to changes in chemical composition which are not accompanied by corresponding changes in tinctorial value and, therefore, may be extremely misleading.

Color and Constitution

M. L. CROSSLEY and P. V. RESENVELT

A study was made of the effect of isomerism on the color of certain azo dyes. It is shown that there appears to be a definite relation between the reactivity of the naphthol sulphonic acids of the beta naphthol and the color of the dyes produced from them. The effect of the sulphonic-acid group on the beta-naphthol ring appears to be greatest when it is in position 3. In this position it acts as a bathychromic group, while in position 7 it acts as a hypsochromic group. The influence of the nitro group on the benzene ring in an órtho position to the diazo group shifts the absorption of the dyes towards red. This effect is manifested to a maximum degree by the nitro group in the ortho position. When the nitro group is in the meta position it acts as a hypsochromic group, shifting the colors of the nitrobenzene-azo-betanaphtholsulphonic acids in the entire series towards the yellow and beyond that of the corresponding benzene-azo-B-naphtholsulphonic acid series. The methyl group substituted on the benzene ring has less influence on color than the nitro group. Chlorine appears to have very little influence on the color of the chlorobenzene-azo-B-naphtholsulphonic acids. Bromine in the ortho position to the diazo group acts as a bathychromic group in dyes resulting from F acid and R salt but has no influence on the color of the dyes resulting from G salt and B-naphthol-3.6.8-trisulphonic acid. The sulphonic acid group introduced on the benzene ring shifts the color of the benzene-azo-B-naphtholsulphonic acids towards yellow, the maximum effect being manifested by the meta position.

Other papers presented at this meeting were:

Rhythmic Bands of Dyes on Filter Paper by Evaporation. The Refractivity, Surface Tension, Conductivity, Viscosity, and Brownian Movement of Dye Solutions

EARL C. H. DAVIES, *Associate Professor of Physical Chemistry, West Virginia State University, Morgantown, W. Va.*

Quercetin, Constitution and Uses

GEORGE L. TERRASSE

"Dyes of the Dinitro-Malachite Green Series"

T. B. DOWNEY, with ALEXANDER LOWY

The Synthesis of Dicyanine A

S. PALKIN

Catalytic Oxidation of Anthracene to Anthraquinone

C. E. SENSEMAN and O. A. NELSON

The Preparation of Phenyl-Thioglycol-O-Carboxylic Acid, Thioindoxyl-Carboxylic Acid, Thioindoxyl, and Thioindigo

M. X. SULLIVAN

Equations for Vapor Pressures and Latent Heat of Vaporization of Naphthalene, Anthracene, Phanenthrene and Anthraquinone

O. A. NELSON and C. E. SENSEMAN

The Estimation of Erythrosine

W. C. HOLMES

Carbazole, Its Purification and Vapor Pressure Determination

C. E. SENSEMAN and O. A. NELSON

DYEING COTTON FOULARD

(*Text. Rec.*, 1922, 40, 46.)

A general account is given of the dyeing of cotton foulards. Direct colors are most generally employed for light shades and cut to a perfect white by the usual hydrosulphite discharge. For navy blues, there is a range of direct dyeing colors which, when diazotized and coupled with beta-naphthol or phenylenediamine, yield beautiful shades of great fastness to light and washing. These colors are discharged with hydrosulphite. Browns are aftertreated with diazotized para-nitraniline, are rendered much faster to washing. The tannin discharge method of obtaining white-on-blue effects is described. Aniline blacks are used for obtaining black foulards.—Abstract in Jnl. Text. Institute.

Dyeing of Mixtures Containing Artificial Silk

Common Characteristics of Artificial Silk and Cotton—Acetyl Silk and the Dyer—Saponification—Incorrect Ideas about Acetyl Silk—Special Dyes Suitable for Acetyl Silk—Making Fabric Ready—Application of Various Classes of Colors

By GEORGE EMMONS

ARTIFICIAL silk has found extensive application in textile articles. Artificial silk hose are manufactured with cotton feet and cotton tops. Sometimes artificial silk and ordinary silk are spliced together and then knitted together. In shirtings and blouse fabrics, artificial silk is employed as effect threads. It is conjoined with cotton or mercerized cotton or genuine silk in manufacturing ladies' dress goods, men's necktie material, and it is also used in trimmings, braids, etc. In short, artificial silk is used alone and in various combinations. "When dyeing in the piece, together with other fabrics, great care and ingenuity are required to obtain uniform colors on both fibers. Usually, it is necessary to dye the material in the yarn before weaving, in order to obtain the effects desired." So says Dr. Mathews in his recent work, Application of Dyestuffs.

However, there is a certain amount of joint dyeing that can be carried out, if sufficient attention is given to the choice of dyestuffs and to the handling of the work.

Thus, where it is a question of effect threads, the artificial silk may be dyed in the skein with Primuline and the dye then properly diazotized and developed. This thread may then be interwoven with undyed material. Lastly, the whole fabric is dyed. Under these conditions, it is more or less necessary that the dyeing with Primuline shall be fast against the subsequent procedures. "Brown shades of good fastness to washing and cross-dyeing (for effect threads) may be obtained by the use of Primuline and a Diazo Black diazotized and developed with resorcin or phenylenediamine."

Use of Sulphide Colors

Sulphide colors are suitable—that is, a selection of them—to the dyeing of artificial silk. These dyes are more or less celebrated for their high degrees of fastness to various activities. "The sulphide colors are generally distinguished by excellent fastness to light, washing, milling, alkalies, acid cross-dyeing and stoving." It will be noted here that "acid cross-dyeing" is singled out as an activity against which sulphide colors are apt to be fast. This is to be understood to mean that sulphide colors are to be assumed as probably capable of producing on artificial silk a color that will withstand later on an acid dye bath. That is, one may expect to find amongst the sulphide dyes individual dyestuffs which may be applied to artificial silk yarn and which will not fade away in a subsequent dye bath of an acid character.

This subsequent acid dye bath is applied primarily for absorption by the other fiber—that is, during cross-dyeing. Now the acid dye bath is often a desirable thing. It is the bath, in fact, which is used when the acid colors are employed. That is why these dyes are called by this name. They constitute a large part of those dyes which may be applied directly to wool and real silk. By "directly" is meant, without a mordant. Consequently, the fact that sulphide colors are apt to produce shades that will not be seriously affected by an acid dye bath is worth our attention. I formulate the following rule as one that is to be regarded as having a broad application, but which may fail in individual cases: Where it is desired to dye artificial silk which is later to be interwoven with wool or with genuine silk and the whole dyed with an acid color, the sulphide dyes are to be considered in connection with the dyeing of the artificial silk.

Another general consideration to take into account is the fact that artificial silk is itself essentially a form of cotton. It may be dyed after the manner of cotton, provided certain precautions are taken. These precautions relate largely to the avoidance of heat, prolonged immersion and mechanical stress. Consequently, when artificial silk and cotton are to be joined in a fabric, the dyeing problem may be viewed as primarily a matter of dyeing cotton fiber. There may, perhaps, be reasons why the artificial silk should be dyed prior to the interweaving and the whole dyed later in the form of a finished fabric. Or the problem may arise under the simpler condition that no dyeing at all is done until the weaving has been completed, when the whole is to be dyed. Under this last condition, we have simply an all cotton proposition. The direct cotton colors are the class of dyes to which the dyer will turn. However, when the whole fabric is subjected to the one dye process, the results on the artificial silk and on the ordinary cotton are scarcely to be expected to match. Cotton in the form of artificial silk is very absorptive with respect to dyestuffs; so that we shall probably find—in many cases at least—that the artificial silk threads turn out darker than those of ordi-

nary cotton. If a single shade is wanted, some method of equalizing final results will have to be adopted. These may consist, perhaps, in a prior dyeing of the ordinary cotton. Allowance could thus be made for a difference in absorptive power when the final dyeing of the united fibers is carried out. On the other hand, there may be many cases, where darker artificial silk will be quite desirable.

Value of Experimentation

Exact information for the cross-dyeing of materials made up from wool and artificial silk and from real and artificial silk is, it would seem, not especially easy to obtain. Under such circumstances, it is often necessary for the dyer to do some experimenting. There is, at first sight, a certain amount of disadvantage in this. However, there is a consideration which makes experimenting a valuable factor in connection with competition. If exact directions how to produce some desirable effect are hard for you to get, they may also be hard for your competitor to get. If you find out by experimentation, then you have a manufacturing secret that gives you an advantage.

However, experimentation may often be narrowed down to a small or reasonable number of things to try. In the present case, the sulphide colors are to be assumed as particularly desirable for the prior dyeing of artificial silk that is later on to be interwoven with wool or real silk and cross-dyeing then applied. One seeks consequently, to do the preliminary dyeing with some one or some combination of the sulphide dyes. The problem of selecting the subsequent dye would then remain. Naturally, a wool dye or a silk dye is the thing. In short, our whole problem narrows down to the dyeing of union goods which are to be viewed as made up of cotton and wool or else of cotton and silk, the cotton here being the artificial silk.

There are quite a number of acid dyes which may be used to dye wool a given color and at the same time leave the cotton undyed. There are over a hundred of these. I mention some:

Acid Alizarine Blue 2B	Fast Red A
Acid Green 3B	Indigo Carmine
Acid Magenta	Light Green SF
Alkali Blue 6B, 3R	New Victoria Blue B
Anthracine Red	Phloxine
Brilliant Black B	Silk Red G
Chromogen I	Tartrazine
Eosin	Wool Green S

The reader is not to regard this list as guaranteeing anything beyond the fact that the several dyes may be used on union goods composed of wool and cotton for the purpose of dyeing the wool and leaving the cotton white. The experimenter may do well to see whether a union goods of wool and artificial silk may not absorb and reject some of these in a similar way. I am simply offering suggestions which may conceivably lessen the work of the experimenter.

There are perhaps as many dyes that will, when suitably employed, dye both cotton and wool alike. Perhaps some of them will act in the same way with artificial silk and wool. I give a few samples:

Benzo Blue RW	Dianil Indigo O
Benzo Dark Green	Diazo Black
Benzo Red	Direct Brown M
Chrysamine G	Direct Gray J
Chrysophenine G	Direct Sky Blue
Cotton Red A	Erie Black
Diamine Red B	Oxamine Violet
Diaminogene B	Zambesi Black F

Then there are a lot of dyes which will dye cotton in a cold bath and leave wool undyed. Relying on the consideration that artificial silk is really cellulose, one naturally expects that these dyes may form a useful class for our present purpose. I name a few:

Benzo Chrome Browns	Diamine Violet Red
Benzo Dark Green	Dianil Orange G
Brilliant Blue 6B	Direct Yellow R
Chicago Blue 6B	Erica BN 2 GN
Chrysophenine G	Oxamine Red
Congo Red	Salmon Red
Curcumine S	Thiazine Brown GR
Diamine Pure Blue A	Zambesi Black D

I reiterate the idea that these suggestions are being passed along for whatever experiment may show they are worth. If the reader thinks they will help, he is welcome to them; if he does not think so, all he has to do is to forget them. In short, I assume no responsibility for success, but venture to hope that the suggestions may shorten the experimenter's road.

Acetyl Silk and the Dyer

Two varieties of artificial silk have, during recent years, had a great vogue. These may be designated as Chardonnet silk and viscose silk. The latter is predominant in the United States, while the former has been in large use abroad. At the present time, as between the two, it is probable that viscose silk has the advantage.

However, another variety is now forcing its way to the attention of the textile world. This new fiber is known as acetyl silk or as cellulose acetate silk. It is well worth our attention, as it promises to develop a field of its own. This field will doubtless be in part one not hitherto occupied by artificial silks. But one cannot rely upon the new fiber failing to set up severe and extensive competition with the older ones now in use.

In America, acetyl silk comes into direct competition with viscose silk. There are good points possessed by the latter, but it has not proved itself a perfect fiber by any means. When wet it becomes weak. This is a very undesirable characteristic, attractive neither to user nor to dyer. It is claimed for acetyl silk that it is capable of withstanding very well such processes as those of the laundryman. It may be that acetyl silk when it contains the same relative amount of water as viscose silk is then no stronger. But it absorbs less, and this may perhaps explain its superiority in withstanding water.

It is said, in effect, that assuming both silks to have been fully saturated in the dye bath and then put through the centrifugal machine, the acetyl silk will contain only 35 per cent of its own weight of water, while viscose silk will contain 90 per cent. This is a very marked retention of strength manifested by the acetyl silk when undergoing operations involving immersion. Acetyl silk possesses, so it is understood, the distinct advantage of retaining its physical strength when saturated with water and the like.

On the other hand, acetyl silk is not so resistant to water that it is impervious. If this were the case, it would perhaps entail great difficulties in dyeing. But the amount of water absorbed is much less than is the case with other artificial silks.

Under natural conditions in the moist English climate, acetyl silk will contain perhaps 5 per cent of its weight in moisture, and thus behaves after the manner of bleached cotton.

The comparative resistance to liquid water is perhaps the principal factor in giving acetyl silk its properties of non-conductivity of electricity and non-conductivity of heat. The latter property enables an acetyl silk garment to afford warmth without an undue weight of material. Similarly, this property of resistance to the flow of heat gives an undergarment of acetyl silk the valuable property of tending to preserve the body from the chilling effects of the evaporation of moisture from wet exterior garments. Still another good quality due to its resistance to the absorption of water may be mentioned. Acetyl silk resists absorption of perspiration.

All these things are pretty sure to tend in the direction of creating popularity for the new fiber. But, of course, there are other demands made upon a fiber, and its responses to these must also be taken into account. One of the most important matters concerns its behavior towards dyestuffs. Let it be said at once then that there are two separate methods of dyeing. In the one process, the character of the fiber is more or less modified in order to assist the fixation of the dyestuff. In the other, the fiber is not modified, but the dye is selected with a view of taking advantage of the existent chemical constitution of the acetyl silk.

Acetyl silk has little or no affinity for the great majority of the important class of dyestuffs known as the direct cotton colors. There are, perhaps, a few of these dyes for which the new fiber has a distinct affinity, but that is all. While this broad fact of non-affinity for the substantive cotton dyes has its disadvantages, nevertheless it has also its advantages. This acetyl silk fiber intermingled with other fibers dyed with these dyes is not especially liable to suffer staining when direct cotton dyes bleed from the adjacent material.

On the other hand, acetyl silk may be prepared in a simple manner, when it will be found to have a good affinity for the direct cotton colors generally. The treatment may be applied during the dyeing or beforehand. A limited saponification with caustic or other alkali is carried out on the fiber. This is the basis of one method of dyeing. In the words of J. F. Briggs in a paper read before the West Riding Section of the Dyers and Colourists (England), this process may be briefly described thus: "The saponification method, in which the constitution of the silk is chemically modified from the surface inwards in such a manner as to regenerate a portion of the cellulose, which can then be dyed by the same methods and with the same dyestuffs as the older artificial silks.

"This method was suggested as long ago as ten years back. The process is based on a modification of the chemical constitution of the fiber carried out in a partial way. If it were carried out to completion, the resultant silk would not differ much from ordinary Chardonnet silk. But this complete modification is really unnecessary. A proper affinity for the substantive cotton colors may be developed by something less. In short, it is desirable to retain certain characteristics of acetyl silk and not to permit its complete transformation into cellulose. What is wanted is a certain amount of modification, no more, no less. This result may be gotten by using just so much caustic soda and no more, and causing this substance to react to the point of complete exhaustion. The central thus becomes quite automatic; the acetyl groups removed are equivalent to the caustic soda employed, and no further action can take place after this quantity is neutralized."

Saponification

There are two conceivable methods of saponification. In the one case the caustic soda penetrates the fiber completely and then saponifies the adjacent material. This more or less uniform saponification all through tends to effect a regeneration of the fiber everywhere, inside and out. An alternative mode of saponification would be one where the saponification anticipates penetration. That is, it begins immediately after contact with the caustic soda. Under these conditions, there would result a regenerated exterior shell (or outer coating), a less regenerated layer next inside, and so on to a central core of unsaponified material. The outside might be pure cellulose, the next

layer a step nearer acetyl silk, with the innermost core pure acetyl silk.

This latter mode of saponification has secured the preference. A method of analysis has been worked out, by means of which some information can be obtained as to the several layers. Cellulose soluble in cuprammonium is taken as the grade of saponified material produced in the outer layer; material insoluble in acetone and cuprammonium is taken as the next layer; and material soluble in acetone, regarded as unchanged acetyl silk, is viewed as the core material. In a typical case reported by Mr. Briggs, the acetyl silk was saponified in a fifty-to-one bath containing 10 per cent of caustic soda, at a temperature of 167 deg. Fahr. (75 deg. Cent.). The outer layer of cellulose, soluble in cuprammonium, amounted to 23 per cent; the intermediate layer, insoluble in acetone and cuprammonium, to 10 per cent; and the inner core, soluble in acetone, to 67 per cent. It would thus appear that two-thirds of the acetyl silk was left unchanged by the saponification treatment; and that only one-third was really affected in the direction of ordinary celluolse. There was produced a cellulose exterior shell and this is the thing which has the affinity for the direct cotton colors. Whether the intermediate layer possesses any distinct affinity for these dyes, I do not know. It does not seem particularly important, whether it does or not. The important thing is that the outside layer has been transformed back to something approaching cotton (which is almost pure cellulose) and that this "cotton" layer naturally has an affinity for the direct cotton dyes. All this is effected, while leaving two-thirds of the fiber pure acetyl silk.

There are two distinct methods of securing the intense exterior saponification coupled with an unaffected internal core and an intermediate layer. We may use the caustic soda in the form of a concentrated solution; or we may use a comparatively low strength at an elevated temperature. Or, perhaps, we may combine temperature and concentration, and then use only a very moderate strength and a very moderate temperature. Severe saponification action at the very beginning is, in any case, the thing sought. It probably matters but little how we get it, whether by heat or strength or a combination of heat and strength.

The saponification may be carried out in the dye bath itself. This is a single bath process and will naturally commend itself to dyers on the ground of economy. Then there is the procedure by which the saponification is carried out in advance of the dyeing. Naturally, this involves two distinct operations—the saponifying and the dyeing. The dyeing is done in the ordinary way, just as if the fiber were a viscose silk.

It is claimed that good results are obtainable by either method. Some dyers, it appears, prefer the one process, and other dyers prefer the other. However, if one finds that no better results are gotten with the two bath process, he may find it cheaper to use only a single bath. The character of the work may exert an influence and direct the dyer now to the single bath process, now to the double bath process.

Some General Remarks

Acetyl silk has been in the world long enough for some incorrect ideas to arise—or, perhaps, it would be more correct to say, long enough for older difficulties in dyeing to persist in spite of advances in manufacture. It has been said, it seems, that acetyl silk cannot be dyed directly unless one prepares the fiber with a swelling agent or some other expensive or difficult method of pretreatment. It is said that the use of a swelling agent marked the oldest procedure, but that methods of this description have no present commercial importance. At the same time, one is not to shut off investigators from continuing experiments along this line. "At the present time, and with the silk manufactured at Spondon by the Dreyfus process, no swelling agents are required; and we have the authority of one of the foremost dyers in this country [England] for the assertion that the silk can be dyed without any modification or pretreatment, to any desired shade and degree of fastness, just as easily and just as cheaply as any of the older artificial silks on the market."

At the same time, one is to expect that certain dyestuffs lend themselves more readily than others to the dyeing of this variety of artificial silk. It seems that some color manufacturers have already begun to recognize the facts and are in consequence issuing lists and the like which have especial reference to acetyl silk.

Special Dyes Suited to Acetyl Silk

Dr. R. Clavel, representing an important dyeing and finishing concern in Switzerland, has given especial attention to the selection of particular dyestuffs which may be used in dyeing acetyl silk without the aid of a pretreatment. This line of investigation is not to be confused with the saponification process, by which acetyl silk is more or less modified in its chemical condition. Whether the saponification occurs in an earlier and separate bath, or whether it takes place in the dye bath, itself, the dyeing is to be regarded as affecting the modified fiber. This is quite different from searching out dyes for which the untreated acetyl silk has a good, strong affinity and using these dyes in the dyeing operation.

By Clavel's system, basic dyestuffs, for example, may be used for acetyl silk, provided the dyeing is done in the presence of magnesium chloride. He also recommended the addition of small quantities of aniline hydrochloride to the dye bath when dyeing the simple mono-azo acid colors. In selecting the azo dyestuffs, preference is given to those which contain no

sulphonic acid groups, and yet are soluble to some slight extent in water. Examples are Terra-cotta and Azochromine (Geigy) and their equivalents. Then among the Metachrome dyes (Brotherton) are understood to be several which are applicable to acetyl silk. Clavel has also discovered, it seems, that Gallocyanin and Alizarin dyes may be dyed on this fiber without the intervention of a mordant. Gallocyanin dyestuffs may be used to produce violets, blues and grays. Many of the shades are understood to be exceptionally fast against light and washing.

Violet PDH (Durand and Huguenin) may be singled out as deserving especial notice for acetyl silk. The qualities of the shades are said to be extremely satisfactory.

Alizarin dyestuffs may be employed without a mordant. It is to be noted, however, that the shades produced with and without mordants are not always identical. That is to say, one cannot rely upon experience with mordants in seeking to determine the precise shade to be expected when these dyes are to be used in a direct manner upon acetyl silk.

By making suitable selections from the basic, acid, alizarin and gallocyanin colors, one may build up a range of shades, simple and compound, to cover just about a complete line. "With care in the selection of the dyestuffs, all the commercial demands for different purposes can be easily satisfied." Besides, other dyes are continually being added to the list of dyes directly available for acetyl silk.

Indeed, the method of diazotizing and developing fast azo colors has been worked out for acetyl silk. This is quite an important matter, as will be more or less realized by those who have familiarized themselves with the possibilities of this method of improving the fastness of such colors for ordinary silk. Aniline black is not exactly a dyestuff. It is a compound that is produced on, rather than applied to, a fiber. The possibilities of producing this color on acetyl silk have been investigated. It is said that commercial results have been obtained. In connection with vat dyes—that is, those developed by oxidation—it is claimed that acetyl silk may be successfully dyed with them and that this may be done without any necessity of resorting to saponification as was formerly the case. This means that acetyl silk may be dyed with vat colors without modifying the character of the fiber. "In Switzerland, where the extraordinary qualities of the finer counts of acetyl silk are very highly appreciated, especially by the ribbon weavers, the experts are most enthusiastic in their reports, stating that in appearance, elasticity and handle, this silk is nearer the real silk than any artificial silk yet produced. Messrs. Clavel & Lindenmayer are actually dyeing large quantities of these fine counts, on behalf of the Swiss weavers, for the Paris trade."

Messrs. Horsfall and Sanderson, of the British Dyestuffs Corporation, Ltd., have reported a method of dyeing insoluble dyestuffs on acetyl silk. That is to say, such insoluble dyestuffs as Induline, Nigrosine, Rosaniline, and other bases may be dyed "from a fine suspension of the dyestuff by pouring its alcoholic solution into a large volume of water. They have also developed a method of "dry dyeing" from benzene containing a small quantity of an alcoholic solution of the dyestuff."

Making Acetyl Silk Ready

When one proposes to dye acetyl silk by means of a dye selected because of the affinity of the fiber for it, the wetting out is an important procedure. The bath for this purpose is prepared from soft water at a temperature of 113 deg. Fahr. (45 deg. Cent.). There should be present in it about 2 per cent of hard soap, and 4 per cent of commercial ammonia solution. This latter is assumed to contain 13½ per cent of NH_3. The percentages of soap and ammonia solution are calculated on the weight of acetyl silk. The object in wetting out the silk in this bath is largely to remove grease and dirt from the surface of the silk. The fiber is worked for, say twenty minutes, and then given two rinsings, both in soft water. After this, the silk is given a souring treatment in a bath containing 2½ per cent of hydrochloric acid of a strength of 30 per cent of HC_1. The 2½ per cent is based on the weight of the fiber and not of the water.

Using Basic Dyestuffs

No pretreatments are required for dyeing acetyl silk with the basic dyestuffs. Naturally, this remark has no reference to the wetting out just described. Tannin is not required, as this mordanting substance is found unnecessary, the natural affinity of the acetyl silk being alone sufficient to fix the dye. The dye bath may properly contain from 1 to 2 per cent of acetic acid. Also, to each liter (2.20 pounds, by weight) of liquid, one may add from five to twenty grams of magnesium chloride. It is said that in some cases common salt is a permissible substitute for part or all of the magnesium chloride.

The temperature is to be brought up to 149 deg. Fahr. (65 deg. Cent.), but not all at once. Two steps are taken. At the final stage of 149 deg. Fahr., equilibrium will be reached in, say, one hour. An acid treatment in a separate bath follows the dyeing. To this bath a little olive oil emulsion may be added. The effect is understood to be the production of splendid scroop. The acid may be acetic, formic or tartaric.

Auramine, Chrysoidine, Bismarck Brown and Methylene Blue may be relied upon for beautiful shades, but fastness against light is hardly to be expected. Malachite Green is, however, claimed to be faster to light when dyed on acetyl silk than when dyed on other artificial silk, or even on cotton mor-

danted with tannin. "Magenta is also faster on this silk than on other fibers. Setocvanin and Setoglancin, blue dyestuffs allied to Malachite Green, also share the same property of a remarkable fastness to light. Typical of a class of basic dyestuffs of the oxazine group, exceptionally fast to light, are Capri Blue and Cresyl Blue. Combinations of the above-mentioned dyestuffs cover the scale of bright blues, royals, saxes, mauves and greens."

Rhodamine S is said to produce a bright pink shade of a good fastness. With Methyl Violets, full and bright shades are to be expected.

It is claimed that all the basic dyes level well on acetyl silk.

Fast Violet DH

This dye is also known as Gallocyanine. It is a basic color, adapted to the dyeing of wool, cotton and ordinary silk. There is a group consisting of this and related dyestuffs. Amongst these are Violet PDH and Modern Violet (Durand). These dyes are more or less reactive to metallic salts. Copper baths are not to be employed. The dye, when acetyl silk is to be dyed, is to be dissolved in cold water. This solution is then mingled with the dye bath and the dyeing started while the bath is still cold. The temperature is gradually raised. The affinity between the dyestuff and the acetyl silk is so considerable that measures are to be taken to prevent too rapid a dyeing. This quality of high affinity possessed by the dyestuff tends to make it economical to use. Violet PDH is to be ranked as a principal constituent of such dark shades as nigger brown, navy blue and black. By using Malachite Green, one may shade Violet PDH for navy blue. Similarly, Azochromin may be used in shading for black or for nigger brown. There may be some tendency for the dyed shade to rub. This may be eliminated or improved by soaping. Finally, bichromate of potash (or bichromate of soda) and acetic acid may be used to develop and fix the ultimate shade. Other dyes of a similar character are Celestine Blue B, Coreine RR, Gallamine Blue, Gallo Sky Blue.

The following general principle may be found of value: It is simply passed on for whatever it may be worth: Gallocyanine is fixed by means of chromium (as, bichromate of potash) and may be conjoined with other dyes that are also fixed similarly. Examples of other dyestuffs of this kind are the wool colors and Alizarines.

The Alizarine Dyes

True Alizarine may be dyed on acetyl silk in a dye bath prepared from soft water. The dyestuff is first dissolved in a small quantity of liquid and then mingled with the dye bath. The acetyl silk, because of the affinity for the dye, will absorb the coloring matter, even though it may be only sparingly soluble in water.

The use of soap has the effect in certain cases of altering the shade. But by a treatment with acid, the original color may, it seems, be restored. Among the useful dyes is Alizarine Orange AO—that is, nitro alizarine. This shade is said to be fast against light. This dye covers the range from pink to old rose. Another one of these dyes is Alizarine Garnet. It seems to have behind it the endorsement of Clavel. The shade is affected very little by soap. A good gray may be gotten from Alizarine Green S. When this dyestuff is employed the temperature of the dye bath should be pushed on up to 167 deg. Fahr. (75 deg. Cent.). The dye Alizarine Blue ABS produces a reddish shade of blue, fast against light.

The Azo of Dyestuffs

There are certain members of the series of sulphonated azo dyestuffs that may be employed on acetyl silk. The shades that come into principal notice are yellow, orange and red. Roccelin is a notable red dye useful in connection with this fiber. Azo Yellow and Metanil are two dyes that may be used as a bottom for emerald green and jade green. The topping is done with a basic green or a basic blue.

Other azo colors, dyes which do not contain sulphuric groups, may be employed to dye acetyl silk directly. The fixing may at times be properly done by means of an aftertreatment with chrome. Among these simple azo colors may be mentioned Alizarine Yellow 3G and Alizarine Orange R. These are salicylic acid derivatives, and are said to be fast against light. Unfortunately, one dyestuff at times has several different names; so that it is more or less difficult to mention all that have a similar constitution. There is the dye Azochromin. There are other dyes more or less similar; but at the same time, some are fast against light and some are fugitive to light. However, a fixing by means of an aftertreatment with chrome may often improve matters. Among the dyes that may here be mentioned as suitable for acetyl silk is Fast Brown 5G paste (British Dyes). Rose Pink CA 58 (Brotherton) gives a bluish pink that is fast to light. Still others suitable for acetyl silk are Chromocitronine, Chromoxanthine and Chrome Deep Brown RR.

Vat Dyes

The vat dyes are those, like indigo, which impregnate the fiber in a modified form. Upon oxidation, this modified form is changed into shades proper to the dyestuff. The vat dyes, including Indigoids and Alzols and Xanthrenes, are suitable for acetyl silk, especially if they may be put through the vat process without much caustic soda. The silk is not previously

saponified. Saponification during the dyeing operation is prevented by the presence of an ammonium salt. The sulphur colors may be reduced after the manner of indigo, and this may encourage us to expect useful dyes among the series. Such processes are still under investigation, it seems; although fast pink and fast blue may be dyed with the aid of Durindone Red Y, Indigo Blue paste and Ciba Blue.

Azoic Process of Developing Dyeing

Mr. Briggs tells us also of expectations to realize large possibilities because of the great affinity of cellulose acetate for aromatic amines and phenols. Diazotizing is carried out in the fiber and the diazotized dyestuff then developed. We have already had an account in these columns of this method applied to ordinary silk. Let me now quote from Mr. Briggs: "There seems, in fact, no limit to the possible combinations obtainable, and it only remains to sort out those items which are of the greatest practical utility and fastness. The amines are dissolved in the form of their hydrochlorides, and the silk is treated with these solutions very much in the same manner as if dyeing with a basic dyestuff. If the amines themselves are colored—as, for instance, m-nitro-p-toluidine, aminobenzol, etc.—the silk may actually be matched to standard undeveloped shades as when dyeing Primuline on ordinary cellulose. When the amines are colorless, it is necessary to work according to formulae and to make trial developments from time to time. The advantage of this method lies in the fact that the excess of dye bath may be washed off, and there is no danger of precipitating loose color on the surface of the fiber. Contrast this with the common method of dyeing cotton with Paranitraniline Red, where chemical affinities do not exist. The diazotizing of the prepared silk and the coupling with alkali phenolate result in beautifully bright shades, perfectly fast to washing and rubbing."

Aniline Black on Acetyl Silk

Aniline black is, of course, not a dyestuff in the ordinary sense; but it is a product developed on the fiber itself. It is a great thing in the world of cotton dyeing. "The attractive affinity for aromatic amines makes this silk eminently suitable for dyeing by the more difficult. The differences are not especially out, using a silk previously mordanted with aniline hydrochloride solution, and then impregnated with a strong aniline hydrochloride, chlorate, and copper liquor. It is whizzed [put through the centrifugal machine], hung up, and oxidized for one hour to one hour and a half at a temperature of 40 to 60 deg. Cent., aftertreated with acid bichromate, and shaded up."

It is thought that the foregoing account may be sufficient to make clear that, while dyeing operations carried out on acetyl silk are different from those carried out on other artificial silks, the processes are not more difficult. The differences are not especially great. It is simply a new branch of dyeing to learn. All the dyer has to do is to learn it. There is nothing impossible about it. Dyers had to get used to Chardonnet silk, viscose silk, etc. Now, it seems, they will need to get used to this fiber. It is pretty certain to extend its sphere, because of the properties that recommend it. "Plenty of dyestuffs are available and plenty of methods, and both of these are being increased all the time. Especially the azoic method offers attractive possibilities of future extension and gives dyeing of unexampled solidity and brilliancy. As the demand develops, dyestuff makers will bring forward new dyes, specially designed for this silk. The silk itself, both in handle and appearance, is manifestly superior to anything which has gone before. Difficulties in manufacture, in application, and in dyeing have been encountered and surpassed [surmounted?] and the new industry is now both technically and commercially established. Nothing can effectually obstruct its development, and there is a big future before it."—Silk.

PROTECTING ANIMAL FIBERS FROM ALKALINE LIQUIDS

The injurious effects of alkaline liquid can be mitigated if glucose, fructose or other sugars, or sulphite cellulose waste liquor be present in the solution. The specification of patent claims that the principle can be applied in most textile processes from wool washing or silk degumming to finishing. Thus in degumming silk caustic alkali or alkali sulphide can be used instead of soap, provided sulphite cellulose waste liquor is added to the solution.

The process has a particular value in vat dyeing. The sodium hydrosulphite vat has had only a limited field in dyeing wool because it is difficult to adjust the proportion of alkali to the necessary requirements.

By this process the alkaline hydrosulphite vat is applicable without limitation to the use of dyestuffs in particular forms. In indigo dyeing deeper shades can be obtained by one immersion. The addition of sulphite liquor or glucose should be about 3 per cent of the weight of the goods. The patentees are the A. G. fur Anilinfabrikation.

READILY SOLUBLE VAT DYES

In order to improve the solubility of vat dyes it is proposed in B. P. 171,078 to add an alkali salt of indigo white to the mixture and evaporating to dryness in a vacuum. The process is particularly applicable to preparations made up with quinone dyestuffs, sulphurized or non-sulphurized.

The Use of the Microscope in the New Bedford Textile School

By ALBERT H. GRIMSHAW

Instructor in Chemistry and Dyeing Department of the New Bedford Textile School

A Paper Presented Before the Technical Photographic and Microscopical Society at the Eighth National Exposition of Chemical Industries

THIS title should be modified by stating that it will tell of the use of the microscope by the general students only, and that part of their course which is taken in the chemistry department. As these students spend but one day each week in this department, they naturally do not have the same amount of time as the chemistry-course students, and do not use the microscope to the same extent.

In their course, one of the first lectures describes the appearance of the various fibers; so the students are shown how to mount the fibers using either water or glycerine for temporary mounts. The various parts of the microscope such as oculars, objectives, stages, etc., are explained to each student separately.

The fibers that are mounted are cotton, wool, silk, artificial silk, flax and ramie. Each student is allowed thirty minutes in which to examine and draw pictures of each fiber. The study of immature or damaged fibers is not taken up at this time but is given in one of the other courses. With but thirty minutes, it is surprising to see the good work that is done by these novices with the microscope.

To keep the actual characteristics of the fibers permanently before them, the students are supplied with photomicrographs of the various fibers; these micrographs are taken, developed and printed by the advanced students of the chemistry department. The drawings and micrographs are used later on in a test that is given to identify the fibers in an unknown sample of cloth.

In the second year of the course, starches are studied, and here the microscope is of the greatest value, as by no other means has it been possible to positively identify the various starches.

As with the fibers, the students mount their own samples, putting seven different starches on one slide; using potato, corn, wheat, tapioca, sago, arrowroot, and at least one other kind. Each student is allowed thirty minutes to study the characteristic shapes and hilums of these samples and to draw pictures. Having to use the microscope and draw pictures seems to impress these characteristics much more firmly on their minds than simply looking at pictures in books. Photomicrographs made by advanced students are also given in this case as with the fibers.

A test is given as follows: The instructor mounts six samples on a slide using different arrangements for each student, then the student is allowed thirty minutes to use the microscope and identify the samples on his slide in their proper order. In the past three years only two students have failed to pass this test, which shows that the use of the microscope is quickly mastered by these students. Such tests are of value to textile men who are buying starches in large quantities, as they can quickly and easily tell by using the microscope whether they are getting the kind of starch that they wish. So here a microscope is a necessity, as it may save time and money.

In getting the pasting point of starches, the microscope is also used by this class. It is a well-known fact that all starches do not paste at the same temperature, some requiring a much higher temperature than others, so tests are made as follows: Starch and water are mixed and placed on a water bath and the temperature is gradually raised and noted. Drops are put on slides, using one slide for each starch, and noting the temperature. The slide is then examined with the microscope, using a low-power objective, and the points at which the starch granules have become ruptured is easily determined, and the fact shown that this temperature is a proper one at which to cook this kind of starch without wasting heat.

As the starches do not all paste at the same temperature, this test helps to supplement the identification of the untreated granules of starch which have been examined with the microscope.

In the final part of this course these students are given samples of cloth that has been specially woven for these tests using the various fibers. By chemical tests and by use of the microscope, they must determine quantitatively the kind and amount of each fiber. The cloth is pulled apart and the fibers examined with the microscope, using the drawings and micrographs from the first part of the course as an aid.

From the foregoing, it is readily seen that the microscope is an important instrument in our textile school, even for this particular group of students, who use it less than many of the other classes. Graduates say that even this small amount of work with this valuable instrument has often been of value to them in the mill.

As the other departments of the school all use the microscope for various parts of their courses such as examining immature or damaged fibers, various weaves, identification of fibers, etc., we would find it difficult to get along without them.

Preparation of Cloth for Finishing

Cotton Faults—Mechanical Faults—Chemical Faults—Manufacturer Liable for Damages Arising from Chloride or Other Injurious Materials

By S. H. HIGGINS and ANDREW HODGE

Members Respectively, Bleachers' Association, Ltd., and Calico Printers' Association, Ltd. A Paper Presented Before the Manchester Section, Society of Dyers and Colourists and Printed in the Society's Journal

IN a paper read at the World Cotton Congress, Manchester, 1921 W. Howarth stated that, "The characteristics of raw cotton which enable a spinner to attain the best results with a minimum of labor may be stated as follows: First, and most important of all, the fibers must be even in length; second, the cotton must be ripe; third, the grade must be even; fourth, the cotton must be free as possible from dead cotton, bearded motes, seed, fibers other than cotton, sand, iron, stones, excessive moisture, and other foreign substances."

The finisher's success is very closely dependent on the success of the spinner in obtaining his supplies possessing the above four characteristics. By full discussion of the difficulties caused by the lack of these characteristics, not only in spinning but in the subsequent process of bleaching, dyeing, printing and finishing, it is hoped that the spinner's hands will be strengthened in his attempts to secure the quality of cotton he requires.

The faults in cotton piece goods which hamper the finisher may be roughly classified into, (1) cotton faults, (2) mechanical faults, and (3) chemical faults, including those associated with the size.

1. COTTON FAULTS

"Black" Cotton

Black cotton cannot be bleached to a pure white, the finished piece being dull—almost gray in appearance. At the World Cotton Conference an American stated that any black cotton appearing was sent by them for black dyeing, and this is a good solution of the trouble. Cloth woven from such black cotton should never be delivered to white finishers or calico printers.

Blue Bender cotton is a variety of peeler cotton characterized by a bluish color which cannot be removed by the usual methods of bleaching. It receives its name from the bends of the Mississippi River Valley in which district it occurs. The exact nature of the color and the cause of its formation are not known, but some authorities suppose that the defect arises from premature frost, while others assume that the cause is to be found in some ingredient of the soil. Apart from its color and resistance to bleaching, the appearance and quality of the fiber are good. The United States Department of Agriculture finds that middling yellow tinged cotton when bleached can be used for dyeing both light and black shades, but good middling blue stained and middling blue stained can only be bleached satisfactorily for dyeing dark shades.

Unripe Fiber

Mr. Howarth, in the paper already referred to, has described how unripe fibers are responsible for spinning difficulties resulting in the formation of neps, and has stated that spinners are called upon to meet claims for damage caused by such fibers in the finished cloths.

The thickened parts of some yarn containing neps, which resist the penetration of the color, have been found by Dr. Harland, of the Shirley Institute, to be composed of quite ripe cotton. They are therefore not neps in the ordinary sense of the term. In the experience of one of the authors, when a cloth contains a large proportion of those thickened parts of the yarn which resist the penetration of the cloth by the color, the shade produced, even on those portions of the cloth that are apparently woven from perfect yarns, is lacking in brightness.

Leaf

Many defective cloths, particularly those woven with the coarser counts of yarn, contain a very large proportion of leaf, which remains from a pale buff yellow to dark brown after the goods have received a normal bleach. This is a very objectionable feature in many styles, and at its worst, leaf is also capable of showing speckiness in the ultimate dyed goods.

2. MECHANICAL FAULTS

Under this heading would fall faults due to unevenly spun yarns, uneven weaving, floats, etc. Most of these features are recognized as faults by the manufacturer, but many of them are exceedingly difficult to locate in the gray cloth, even when a close examination of it is undertaken by the finisher. The most outstanding faults of this character to the dyer or printer are probably uneven weaving which gives alternately thick or thin places in the weft or reediness in the warp, and which, although

in many cases hardly noticeable in the gray, show up in the ultimate dyed or printed goods as light and dark places, constituting what is known as "streaminess."

A defective sand roller on a loom causes small holes in the cloth, and sometimes these holes are accompanied by small particles of iron rust if the loom has not been used for some time. These holes are sometimes difficult to see in the gray goods, even with careful examination, but the bleaching process enlarges the holes. The temple of the loom causes similar holes, but at the sides of the cloth. The gray plaiting machine has been proved to cause damages from time to time, and these damages in the form of small holes were difficult to trace to their source.

Pins, teeth of steel combs, etc., left in cloth by weavers cause stains and tears in the cloth. Sometimes these articles remain in the cloth to the end of the process and get into the calender bowls. For instance, it is a comman thing to get heddle wires in calenders from goods woven on Jacquard looms. These wires are used to separate the warp threads. If they get into the calender bowls small round holes are cut in the cloth. In one case a thin place or "felter" had been carefully made up by the weaver to almost escape detection, but after finishing a square hole was found. Cropping machines sometimes cause small holes by pulling bits of cloth out along with the loose threads, and with the strain of the bleaching and finishing machinery a small sqaure hole results. If the warp threads only are cut, then the strain pulls the cut warps apart in a regular manner, but if both the warp and the weft are cut, then an almost square hole results. A cropping machine can also damage cloth by the knife blades not being properly adjusted. Sometimes the weft threads are cut badly and the manufacturer may blame the tension in mercerizing or stretching. Bad frets in the cloth sometimes make finishing impossible.

The structure of the selvedge is of importance to the finisher. In some cases the selvedge curls, which renders printing, dyeing and finishing difficult, or even practically impossible. In order to get certain finished effects a definite process must be followed, which means that the cloth must have a definite and large number of runnings. If finishers give more runnings to their cloth than is necessary, the cost of production is too high and is soon noticed, so that the tendency is against overworking the cloth, but the cloth received must be capable of standing the runnings necessary. If the selvedges are hard and 'round instead of flat, they are liable to cut or tear away from the body of the cloth, and if the threads in the selvedge are badly drawn they tend to form a hard solid selvedge, which may be an advantage in weaving, but gives trouble when calendered. Irregularity in the number of threads in a selvedge caused by bringing in loose ends will sometimes cause damage where extra threads have been introduced.

Mr. Bancroft (U. S. A.) spoke at the Cotton Conference on faulty selvedges. By strengthening the selvedge at the expense of the warp threads of the cloth, the strain in the processes is taken by the selvedge and damage results. He advocated drawing eight threads as four in the selvedge. Also if the makers of the cloth twist their threads spinning twist instead of twisted twist, then the selvedge threads will stretch at least 6 per cent more.

Many weavers' seams are so stitched together that they will not carry through the finishing process; sometimes they are not stitched at all, and, breaking the continuous run through the first machine, render it necessary to thread the machine up again. Owing to this loss of time and inconvenience, such pieces should be distinctly marked in coming from the loom.

3. CHEMICAL FAULTS

Faults of the Size

The finisher's troubles from this source arise from excessive quantities of size being used and from the use of undesirable ingredients in the size, such as zinc and magnesium chlorides, paraffin wax or tallow containing paraffin, and from the use of coloring matters which cannot be bleached out.

All the size put into the warp has to be removed by the finisher during bleaching, and the less he has to remove the better. If the weight of size to cloth was constant, the bleaching operation could be controlled with a greater degree of precision, but the percentage of size on the gray weight of cloth found in a number of printers' cloths taken at random varied from 6 per cent to 35 per cent.

The use of magnesium and zinc chlorides has considerably decreased as the result of the finishers' campaign against such use, but it is still in evidence from time to time as shown by small holes caused in the singeing process, and in extreme by serious tendering of the whole of the cloth. It is certain that those manufacturers who still use these dangerous substances could, without serious difficulty, discontinue their use. It may be useful to mention that some of the ready made softeners sold for use in sizing contain these chlorides, and a manufacturer buying such products might therefore be using them unwittingly. China clay has been used for sizing light goods and is not entirely removed in the bleaching, and the residual clay affects the finish of the goods. Recently a non-injurious sizing which does not involve the use of foodstuffs and is removable by boiling water has been patented (No. 169,103 of 1921). It contains sodium silicate, aluminum sulphate, and china clay, and it is possible that the clay might cause some trouble.

The use of excessive amounts of fatty matter in the size is also a fruitful source of trouble and irregularity to finishers, even when the fatty matter used consists of pure tallow, which is mainly saponifiable. Some cloths contain as much as 2.5 per cent of fatty matter, while other similar cloths contain only 0.6 per cent. Many commercial tallows are adulterated with paraffin wax, which, being unsaponifiable, is not removed by the process of bleaching and gives rise to stains of various character in the finished goods. Commercial "tallow" has been found to contain as much as 50 per cent of unsa-

ponifiable matter, and tallow has been sold to manufacturers as pure beef fat and found to contain 15 per cent of paraffin wax. Spermaceti wax has also been used in sizing mixings and being unsaponifiable causes trouble in finishing. Such paraffin or wax stains in finished cloth are of a particularly objectionable character as they are invisible in the gray, incapable of being removed by any ordinary bleaching process, and almost invisible in the white cloth. The affected parts of the cloth, however, resist dyeing and finishing.

We wish to press home to manufacturers that they are running a risk by using these substances. Recently a case of paraffin wax staining came to our notice where it was evident the trouble was caused in using pieces of paraffin wax for rubbing on the threads during weaving in order to lubricate them and, though the amount of wax taken up in this way is small, it is quite sufficient to cause trouble, and a great effort should be made in the interests of the industry to eliminate paraffin absolutely from the sizing and weaving branches of the industry.

Warps have been known to be tinted with a yellow dyestuff to make them appear like Egyptian cotton. In one case the dyestuff could not be bleached out but spread a yellow tint over the cloth and damaged it. For some classes of weaving the tinting of the warps is said to be an advantage, and blue tinted warps are sometimes used in Jacquard looms, but great care should be taken that the dyestuff used can be easily removed in the bleaching process. Yellow ochre has been used in sizing mixings, and caused trouble in the subsequent bleaching of the cloth.

Among chemical faults may also be mentioned stains due to mineral oil which may have come in contact with the yarn or cloth in the course of spinning and weaving, from drippings from the roof or from the slasher cylinder covers, oil getting onto the roving or oil from the roller necks and in the top boards in the card room. When the weaver pieces a thread an oil stain will result if she has oil on her fingers, and this stain cannot be removed in the ordinary bleaching process. Marks from picker bands due to oily and waxy matters in the stuffing of the leather will not come out, but leave yellow marks. If the stains are from pure oil they show up yellow in the finished piece, but if the lubricating oil has come from a bearing and contains any copper or iron, then the trouble is greatly aggravated.

When cloth containing such oil is well scoured the oil may be removed, but not the metallic particles, and these are rarely completely removed in the cloth and are frequently quite invisible in the white goods, but become visible either as places resistant to the colors subsequently applied or as colored stains in the white portions of dyed goods, and when such goods are treated with chemic to produce the ultimate white required the metallic particles act on the chemic, giving off oxygen and tendering the cotton with which they are in contact. If the contamination has taken place in the spinning, single threads may only be affected, producing cuts in the cloth, but if the stain has spread to more than one thread, as would be the case if they are caused in weaving, holes may result. Attempts to remove these metallic stains by treatment with oxalic acid or salts of sorrel are exceedingly dangerous.

Some years ago it was shown that by using a lubricating oil containing 75 per cent of colza oil and 25 per cent of mineral oil, any oil stains would be removed in the bleaching process. It would be interesting to know whether such an oil has been adopted to any large extent in the weaving industry. Experience shows that in a matter of this kind a slight difference in cost is the factor that decides adoption or rejection.

Lead stains from looms and other parts of the textile machinery will not bleach out, but leave light brown stains.

The bleeding of dyestuffs in the bleaching process causes much trouble. It is more likely for variations to take place in the process of dyeing, which is sometimes a long and difficult one, than in the process of bleaching, which is more or less standardized.

After the Cotton Conference a committee was formed to go into the question of the fastness of colors to bleaching, and this committee is making headway.

With gold headings trouble is caused to bleachers by the rubbing of the gold thread and the use of poor gold thread which exposes the silver and causes it to blacken more readily, with a tendency to the tendering and destruction of adjacent cotton threads. The gold thread should be a drawn silver wire with an extremely thin coating of gold, and not a gilt copper wire.

General

When faults are pointed out to manufacturers they frequently contend that the bleaching is at fault, but it should be borne in mind that to remove foreign matters, such as paraffins, involves drastic methods of bleaching, and the finisher is running two serious risks: First, that of rendering his cloth unsuitable for the finished effect that is required, and second, the risk of weakening or actually rotting the cloth. Short of running these risks, it may be taken that the finisher is continuously attempting to remove all foreign matters as completely as practicable.

J. Taylor, speaking at the World Cotton Conference on the legal aspects of the question, pointed out that the manufacturer is liable for damages arising from chlorides or injurious material used in the manufacture of cloth. "From the merchant's point of view this is a useful clause, as it calls the attention of the manufacturers to a liability which is not generally known in law; if the manufacturer knows the goods are bought for the purpose of finishing there is a warranty implied that they will be fit for the purpose. The contrary, I think, obtains if the manufacturer is not aware the goods are to be processed and he has merely put in magnesium chloride or other substance for the purpose of improving the appearance of

the cloth in the gray." The position, however, could easily be made stronger from the finisher's point of view, for he ought to insist that no chlorides or unsaponifiable waxes should exist in the cloth he receives. They are not necessary and such a position would make the manufacturer careful to get from the suppliers of tallow and softeners for the sizing mixings a guarantee that they contained no wax on the one hand and no injurious chlorides on the other. From time to time we still find sizing mixings recommended which contain those chlorides, in spite of the fact that other softening agents are available. Since the cause of the faults produced during the singeing is not thoroughly understood, it seems a bad policy for weavers to have any of these chlorides inside the weaving shed. It is necessary for finishers to keep this matter continually before manufacturers.

Regarding faults in cloth, Mr. Taylor says, "If a manufacturer sells cloth knowing that it has to go through a process, he will be liable in respect of defects which the process discloses and which were not apparent in a reasonable examination of the goods in the gray. If, on a reasonable examination, the gray did not reveal the defect, but it became apparent during or by reason of the process, the buyer, and therefore the finisher, would have a good claim."

Mr. Manley (Sayles Bleachworks, U. S. A.), at the World Cotton Conference, said the Americans would be glad to co-operate in introducing a standard form to be filled up to indicate cloth faults, and suggested a joint advisory board to deal with these matters.

As regards stretching goods to width, it must not be forgotten that there is a certain amount of stretch which can be given to fabrics beyond which the strength of the fabrics is decreased. It is important that merchants should realize this.

Discussion

In the discussion which followed, A. Hodge said since the subject was first raised at the World Cotton Conference, a considerable amount of interest had been awakened among spinners and manufacturers, and he hoped that those who were up against various types of faults in the course of their work would make great efforts to get into direct touch with the manufacturer. The use of magnesium chloride and zinc chloride in warp sizes continued in the weaving industry despite the efforts made to dissuade manufacturers from their use. He would mention some examples of typical faults. One was that of a cloth float which had been covered up with some fatty matter in such a way that it was very slightly visible in the gray. The fatty matter, which had been applied very liberally, had marked off when the cloth was wound and the defect caused gradually diminished along in the piece. The weft of another showed a fault due to mineral oil having got onto the cop before weaving. This went irregularly across the piece due to the cloth having got crooked. Another piece showed a defect due to paraffin coming from the warp size, and the specks corresponded with the warp threads. Commercial tallow was frequently adulterated with paraffin wax, and those who were interested in the spinning and weaving trades would have to be a good deal more careful in the future than they had been in the past, as to the character of the material they used. An interesting example was the case of a lot of cloth, part of which was dyed Para Red and part Indigo. There had been some black oil threads in the weft, and there was a network of spots on the dyed goods. The weaver had quite legitimately soaped the black oily threads in order to make the pieces presentable, and this had been carried out while the cloth was in contact with the sand roller of the loom. The sand roller was covered with perforated sheet tin, and the effect was very similar to the resist effect in the dyeing with Indigo. A manufacturer found in another case that one of the operatives was using a slab of material to remove stains from his warp which on analysis was found to be composed of 75 per cent of fuller's earth, mixed with salts of sorrel. The result when the cloth went over a singeing plate was disastrous. In many weaving sheds it was the practice to allow the weavers to buy their own soap, and this was a frequent cause of trouble.

A common cause of faults was "dead" cotton. There were present for inspection some examples of Para Red, in which there were numerous little specks which had not fully taken the dye, and which consequently appeared as a yellowish shade. A fent which had been redyed still showed the same fault. When these specky places, which were wrongly described as "dead" cotton, occur in large number there is a general poorness in the dyeing of the rest of the fabric; even those portions of the cloth which have been fully penetrated by the dye not achieving full brilliance. This seemed to be due to some quality in the cotton fiber itself. It might be due to the cotton fiber itself. It might be due to the cotton containing a more than normal percentage of natural waxy matter, and which had not been fully removed, or to a physical peculiarity of that particular class of fiber.

Dr. S. C. Harland said that he had examined the defect last referred to and though occasionally hairs were found which might reasonably be called "dead" cotton, these were not present in such a quantity as to account for the defects. The dye penetrated only to a small distance in the body of the yarn itself. It really only dyed an area perhaps consisting of six fiber diameters from the outside. A photomicrograph shows that the defective portion consists of an intertangled mass of hairs, some of which are of abnormal diameter. The point raised by Mr. Hodge that certain cottons might have differences in the unsaponifiable waxy constituents of the cotton hair was interesting, and it had been proved that such differences do occur naturally.

The Chairman (Prof. E. Knecht) said that many references had been made to the injuries which attended the use of magnesium chloride and zinc chloride in warp sizing. He had a suspicion that although faults had been

traced to these chlorides, the chlorides used may have frequently contained some free acid. Similarly a good deal had been said with regard to the use of waxes of different kinds. He remembered doing an experiment in which bleached cotton was splashed with a solution of paraffin wax in benzol. It was subsequently dried at a temperature which would melt the wax in the fiber and dyed in a number of direct cotton colors. It dyed perfectly level throughout with all the colors tried. The experiment was not tried with Para Red. References had also been made to the use of mineral oil in the spinning and weaving machinery and to the production of stains by the metallic particles present. Had the lecturers any experience with the use of stearic anilide in ensuring the complete removal of the mineral oil by mere soaping? He did not know whether the lecturers included beeswax and such waxes under the head of unsaponifiable waxes. Beeswax, like cotton wax, was unsaponifiable unless alcoholic potash was used, and that was not likely to be employed in a bleach works. Such waxes were readily removable by virtue of their property of forming emulsions on soaping. With regard to "dead" cotton, he was informed that in a combed yarn the bulk of this was taken out. Were the pieces in which the "dead" cotton occurred constructed of combed yarns?

Mr. Higgins said that combing took out the "dead" cotton and it also took out the neps. As regards the use of waxes a large proportion of the wax was removed by emulsification with the olive oil, but occasionally the wax was not removed. You might use beeswax, spermaceti, or paraffin wax, and in many cases you would get no trace of it in the bleached or finished cloth, but in other cases some would remain. Though bleachers had not nearly the trouble they used to have, hardly a week went past without some stains arising from paraffin wax. It was a far more serious matter from the calico printer's point of view than from the bleacher's point of view, because the slightest trace of paraffin wax acts as a resist. He had not heard of stearic anilide being used, but as regards finishing it was often found that soaping was not a good thing, because there was always a danger of leaving soap in the cloth, and that was not permissible for many finishes. He was aware of the Chairman's work with respect to magnesium chloride. They did not make any statement in the paper as to the cause of the tendering, but only that if chlorides were used, trouble was likely to occur. On that ground, they suggested that chlorides should be discontinued.

J. R. Hannay said that selvedge faults were exceedingly awkward to deal with in printing and dyeing. Tape selvedges were often stipulated for in order to overcome the curling trouble, but a number of manufacturers put two very strong threads on the outside of the selvedge, and when high glazing was required, and the cloth put through a heavy calender, the whole of the weft threads were cut down the edge of the piece, the result being a very ugly and ragged appearance. The attention of manufacturers should be called to this trouble. He had never tried pure magnesium and zinc chlorides, but he had tried them when neutralized before use in sizing and the tendering was just as marked with neutral chlorides as with commercial chlorides. Whatever may be the cause, there was something inherent in commercial zinc and magnesium chlorides that gave distinct tendering, especially when singeing heavy cloths. There had been a serious recrudescence of this trouble within the last few months. Out of fifty lots of cloth he had examined in the last few days, no fewer than ten contained zinc chloride. There was something to be said from the manufacturer's point of view for the use of paraffin wax in sizing. It gave a greater pliability to the cloth than tallow sizes alone. If a carefully mixed size containing a proportion of paraffin was used it did not cause any great trouble in bleaching. The point was that paraffin wax was used without discretion. Probably careful investigation of the sizing process and the laying down of lines for the mixing of sizes containing paraffin would bring about a satisfactory solution without prohibiting the use of paraffin wax. But they had the weaver as well as the manufacturer to deal with. He was personally acquainted with mills in which paraffin had been abandoned in the sizing room, and in which the weaver carried a paraffin candle in his pocket, and whenever any trouble occurred in the loom it was rubbed surreptitiously on the cloth. A curious instance of the trouble arising from paraffin wax came to his notice. Some vat-dyed goods showed resist marks in the weft, but not in the warp. The manufacturer said he did not size his wefts at all, he only sized his warps, and the spinners of the yarn denied that they used any paraffin wax at all. Eventually the defect was traced back to the fact that the centers of the bobbins on which the cops were wound had been heavily coated with paraffin wax. The probability was that these tops had been stored somewhere near a steam pipe, and the wax had softened and penetrated into the cotton. With regard to contamination from loom oils, it would be a very desirable thing if all weavers would use a certain proportion of castor oil in their lubricating oils. If loom oil stains, when detected in the gray pieces, were smeared with castor oil before the cloth was put into the bleaching kier, they were almost invariably removed, unless there was serious metallic contamination in the oil. Vat-dyed headings were very undesirable in the case of printers' headings. The dye becomes reduced in the kier, and dyes out in patches with the circulation in the liquor. Vat dyes were very fast to most influences but were unsuitable for headings.

Mr. Hodge agreed with Mr. Hannay that in certain admixtures under certain conditions, which, however, were quite unknown, paraffins and unsaponifiable waxes did bleach out.

William Thomson said that while 2½ per cent of tallow in the cloth was considered a large amount, he had found in a number of cases as much as from 4 to 4½ per cent. He had found fish oil present in tallow, and this became brown by oxidation. Ordinary mineral oil also gradually

oxidized and developed a brown color, which could not be removed by bleaching. Calcium chloride was sometimes used and was as capable of decomposing and tendering the cloth on singeing as chlorides of zinc and magnesium. If the latter were used in equivalent proportions, a much greater amount of heat could be withstood without producing tendering. If the warp threads remained in the reed during the night, then if the chloride of zinc contained chlorate of chloride of ammonia, but more especially if both are present, iron stains would probably be produced. With regard to gold threads, i. e., silver covered with gold, if a microscopic examination of these were made, it would be found they were not covered entirely but that the gold existed in little patches over the thread, and that it was not in any respect continuous. In mixing paraffin wax in the sizing material, a small quantity of soap greatly facilitated the mixture. Was there any objection to the use of soap for boiling with tallow and paraffin wax?

J. Campbell Gray quite agreed with the statements made respecting the detrimental effect of chlorides of calcium, magnesium and zinc upon cloth during singeing. The next thing was to find a remedy. When he found magnesium and zinc in the cloth, to avoid the trouble mentioned he washed the cloth before singeing. Had Japanese wax been found in any of the samples showing similar faults to those with the paraffin wax, and if so was it possible to remove Japanese wax in the process of bleaching? He had found that almost impossible.

Mr. Hodge said that it was the practice of the Calico Printers' Association, when injurious chlorides were discovered to be present in the gray cloth, to intimate to the customer concerned that he would have to pay for washing them out. If the customer refused to pay for washing out, they did not singe. The experience of Mr. O'Neill had been that Japan wax was injurious and produced the same stained effects as paraffin wax. The way in which waxes and mineral oils produced these peculiar stains was very obscure. They had made numerous attempts to reproduce these effects by using all sorts of mineral oils, without any particularly well marked success. Probably the factor referred to by Mr. Thomson came into play. Mineral oils sold as lubricants were an unknown quantity. Cotton had to go through a very long process before it reached the finished piece, and a drop of mineral oil might get on to, say, the slubbing, and by the time the slubbing has become yarn, what was just a fraction of an inch of slubbing saturated with oil becomes many yards of yarn, and during all that period there had been a very large surface exposed to the oxidizing action of the air. There was no knowing what change had taken place, particularly when the oil had been loaded with metal.

Mr. Thomson said that if a piece of cloth were put over a Bunsen burner for a moment until it became brown, then if it remained quite strong it might be taken there was no chloride present which would do it harm.

J. Campbell Gray suggested that some fugitive coloring matter be added to the soap and other materials used to remedy the faults of weaving. In that way they would be able to see them, and co-operate more easily with the manufacturer in the removal of stains.

Mr. Hodge said that these soaps were frequently added to conceal the defect which had been produced in the goods; therefore he was a little skeptical of the willingness of the manufacturer to adopt the suggestion.

Chrome Mordants and Chrome Dyes

Logwood Black on Wool—Removal of Grease Important—Mordanting Methods—Depth of Shade—Uneven Mordanting—The After-Chrome Process—The Chromate Process of Cassella

FROM time beyond recollection the common salts of chromium have been made use of as a mordant for the fastest dyes upon wool. The recipes of the old dyers of preceding generations contain many references to the use of bichrome as a necessary agent for fixing most of the old wood dyes that yielded the fashionable shades of our ancestors. At the present time the value of bichrome is still a matter of great importance, and the majority of our fast shades on woolen and worsted fabrics are obtained with its aid.

While many dyes obtained from coal tar are to be dyed upon a mordant of or with bichrome, there are still a few dyes of vegetable origin that are supplied in a similar manner, and among which logwood may be mentioned as the most important type. When properly dyed, logwood, shaded as occasion demands, yields the finest black upon wool. Its shade, fulness and brilliancy have never been surpassed by coal-tar dyes, and in but few instances has it been equaled. This remark applies with equal force to logwood black upon silk, but we are not discussing the latter in this article.

Thoroughly Remove Grease

Mordanting wool with chrome requires that the wool should have been well scoured and rinsed. No wool-grease or soap should be left in the stock, yarn or cloth, otherwise dull shades will result and goods are likely to crock. The reason is obvious; and grease allowed to remain in the wool combines at once with the chromium in the mordanting bath, forming a chromium salt of the fatty acid which remains in the wool through all the succeeding operations, including the finishing. This compound of chromium becomes colored during the dyeing, and owing to its waxy or

fatty nature readily rubs off and imparts its color to whatever touches it. It therefore becomes necessary, in order to have well-dyed goods, to begin with the scouring.

The present article touches upon the usual mordanting and chrome dyeing processes as employed for the fastest dyes of their several classes.

Method I

By what we may call the first method, chromium is first applied to the previously cleaned wool. It may be regarded as the classical process for mordanting, on account of its long usage by dyers and the certainty of its results. It is the one process most generally used where the best results are desired. It almost always yields level shades where other mordanting processes fail. In dyeing wools that are to be mixed to produce soft, melange effects, it is to be preferred to any other mordanting process, since, when properly done, and with dyes that have been carefully selected, the fastness to milling is of the very highest order.

As a rule, the process is carried out by boiling the wool for one and one-half hours in a bath prepared with from 1 to 4 per cent bichromate or potash and 1 to 3 per cent of crude argols or cream of tartar, and then rinsing. Simple though the directions are, there are a few conditions to observe without which constantly uniform results will not be obtained. As previously stated, clean wool is essential. Excessive quantities of bichrome or too prolonged boiling are likely to cause not only positive injury to the wool but the defect known as "overchroming." This latter, besides injuring the wool, also causes a loss of some of the dyestuff.

Depth of Shade

In mordanting wool it is desired that the amount of chromium on the fiber should have some definite relation to the depth of shade desired. If the shade wanted is light or medium, it is desirable that the amount of chrome be in the same proportion, while heavy shades will require larger quantities.

The following table will show approximately the amount of both bichrome and argols for shades of different depths:

	Bichromate of Soda or Bichromate of Potash	Crude Argols or Cream of Tartar
Light shades	1 per cent	1 per cent
Medium shades	2½ "	3 "
Heavy shades	3 "	4 "

Instead of bichromate of soda, the corresponding potash salt is used in exactly the same quantities. Prior to the war the potash salt was commonly used. Dyers did not take kindly to the soda salt, and raised all manner of objections to its use. When the war was on, the potash salt promptly disappeared from the market, and then the soda salt came to the front, while nothing is heard of the old objections.

Lactic acid can take the place of argols in practically equal proportions. It is preferred by many dyers on account of its less rapid chemical action on the bichrome, and also for its property of leaving the wool in a much softer condition. Besides lactic acid, other substances are made use of in particular instances, but the best results are to be had with those above mentioned.

Uneven Mordanting

One essential point to observe in applying chromium to wool is to have it go on the fiber evenly. Too rapid boiling is the chief cause of uneven mordanting; it is desirable that mordanting of the wool or yarn proceed at a gentle simmer, and in a volume of water sufficiently great to permit free circulation. This tends to evenness.

After mordanting, the wool is to be well washed in order to remove from it any excess of mordanting liquor, which if allowed to remain absorbed by the wool would cause the resulting shades to crock.

As a general rule, in dyeing chrome mordanted wool the bath is prepared with the proper amount of dyestuff for the desired shade, and with due regard to the amount of mordant. There is also added to the dye bath from 2 to 10 per cent acetic acid of the ordinary commercial strength. Dyeing proceeds with a gradual increase in temperature, commencing at 110 degrees and going to the boil. This rise in temperature usually requires forty-five minutes, during which time the material is thoroughly impregnated with the dye liquor. Boiling then continues for one to one and one-half hours. Generally the dye bath is exhausted in one to one and one-half hours; but some dyes do not exhaust as readily as others, hence the necessity for adding a further small quantity of acetic acid to effect complete exhaustion. The spent dye bath is of no value for further lots of wool, and is to be run off.

Method II

What we will term the second method is commonly called the "after-chrome process," and takes its name from the fact that a chrome mordant is added to the spent dye bath, and then subjected to a further boil.

The dyes used for this process are very numerous. They are dyed on the wool in an ordinary bath charged with Glauber salt and acetic acid—up to 20 per cent of the former and 10 per cent of the latter, according to shade. Dyeing commences at 120 deg. Fahr., and is gradually raised to the boil in about forty-five minutes, gradually adding an additional quantity of 5 to 10 per

cent acetic acid or 1 to 3 per cent oil of vitriol. This further quantity of acid is for the exhaustion of the bath before the chrome is added. This is important; if the chrome for the after-chrome treatment is added before the dye bath is exhausted of dye, some of the dye will be converted into insoluble compounds that will crock.

After the bath is exhausted it is allowed to cool slightly, during which time the material must be completely immersed or kept in motion. Then add from ½ to 3 per cent of bichromate and boil for one-half to three-quarters of an hour, according to the depth of shade. The quantities indicated above for chrome are the extremes. After dyeing, the wool must be well washed. This process has some advantages, especially for piece goods being dyed black, brown and other heavy shades. It is particularly useful in dyeing piece goods with plain or mercerized cotton-effect threads or pencil stripes.

The main point in using this process is to be assured that the dye is properly put on the cloth in the first place, since no amount of boiling or other expedients will level the shade in after-chroming, but, on the contrary, uneven dyeing will be intensified.

Method III

The third method is the well-known "chromate process" of Cassella, in which both the dye and chromium salt are used in the dye bath together. It is also known as the "meta-chrome process," and by other fanciful names. It is simple in operation. The dye bath is prepared with the proper amount of dyestuff, which must be completely dissolved. Then fill the kettle to the proper working level, but keep the temperature at about 125 degrees, and add about half as much bichromate as of dyestuff used, together with ¼ to ½ per cent of sulphate of ammonia (calculated on the weight of the goods being dyed). If a 3 per cent shade of brown is to be dyed, the chrome mordant would be 1½ per cent of bichromate and ½ per cent of sulphate of ammonia.

This mordant is interesting to study. For 100 pounds of cloth there will be 3 pounds of dye, 1½ pounds of bichrome and ½ pound of sulphate. The two latter make a mixture of 75 per cent bichromate and 25 per cent sulphate; such mixtures of "patent mordant," etc., have been made by dye sellers and sold to dyers for prices in excess of their true value. While the exact quantities above given are not always adhered to, the results are nearly always identical.

Dyeing by this process proceeds at 125 degrees for about twenty minutes, after which it is raised to the boil in thirty minutes and continued for one to one and one-half hours. Generally, a small quantity of acetic acid is added to the bath after boiling as above. It must be noted that the actual dyeing of the wool only takes place during the boiling, and when the sulphate of ammonia is being decomposed with liberation of free ammonia.

This process is used for dyeing loose wool of the better sort and slubbing, and yields shades of particular fastness if the dyes are properly selected. It is also used for piece goods, men's and women's wear, and is generally of wide application.

Briefly, for fine, heavy, full shades the writer regards the old chrome-mordant process the ideal one where output is secondary to quality. By this process, in the hands of skilled workmen, the quality of the goods is unapproachable. Where output is of first consideration, the chromate process commands attention; while for striped effects the after-chroming process is to be recommended.

By whatever process wool is mordanted with chrome, all the latter required for a batch may be added at once to the bath, taking care that the temperature is gradually increased. It is both during the gradual increase of the temperature and the subsequent boil that the deposit of chromous oxide is effected on the fibers.

This is a most important condition of mordanting that has not been exhaustively studied, and considerable work remains to be done. It is one of those chemico-physical problems closely related to colloidal chemistry.—Textile World.

THREADS AND FILMS FROM CELLULOSE ACETATE

When a solution of cellulose acetate in an organic solvent is coagulated by means of water, according to Brit. Pat. No. 179,234 as abstracted in Jour. Soc. Dyers and Colourists, it forms threads or films having a discontinuous granular or reticulated internal structure which lacks strength and elasticity. It has been already proposed to add thiocyanates to the coagulating baths or to the cellulose acetate solution in order to overcome this difficulty. Such substances exert a swelling and coagulation controlling action on the filaments undergoing the coagulating operation, and thus tend to preserve continuity of structure and prevent the too complete shrinkage of the cellulose acetate which occurs on removal of the organic solvent by water alone.

In the present invention claim is made for the use of other substances which exert similar swelling and coagulation controlling effects. Among these are organic solvents soluble in or miscible with water; e. g., acetone, alcohol, acetic acid, formic acid and aqueous solutions of zinc chloride, etc., all of which exert a solvent or latent solvent action on cellulose acetate. The filaments issuing from the spinning nozzles have considerable strength, and, owing to the combined action of the swelling agent and water, they may be drawn out as fine as natural silk.

American-Made Colors

A Classified List of All Dyes of American Manufacture, Giving the Name of the Maker and His Trade Name for Each Product

Group I.—Acid Colors

HEREWITH we publish the first installment of what we had hoped to make a complete list of all colors at present manufactured in America, together with the names of their manufacturers. Our original purpose has been impossible of accomplishment for several reasons. In the first place, five or six manufacturers, either through indifference or disinclination, have failed to furnish us with a list of their products. Moreover, the list itself has been so long in compiling that many concerns who reported have undoubtedly added to their lines since the desired information was sent us.

We believe, however, that the list as printed is 90 per cent complete. In several cases, at least, the manufacturers themselves do not sell direct to the consumer but distribute their products through dealers or other manufacturers. We have purposely eliminated products of American manufacture sold through dealers under varying names and have endeavored to give only original sources of supply.

The list of colors when complete will include the following classifications: (1) Acid Colors; (2) Basic Colors; (3) Chrome Colors, including Alizarines and pseudo-alizarines; (4) Direct Colors; (5) Eosines and similar products; (6) Fur Dyes; (7) Nigrosines, Indulines and Oil Colors; (8) Sulphur Colors, and (9) Vat Colors. These classifications have been adopted as most suitable for ordinary use. Under each general classification the dyes have been divided into alphabetical groups according to the colors they produce—that is, blacks, blues, browns, etc. Under each color classification the products of individual manufacturers have been grouped together—that is, all Acid Blacks made by the National Aniline & Chemical Company, for instance, will be found together, as will all Direct Blues made by the Newport Chemical Works, etc. No attempt has been made to group identical or similar products together other than the general classifications above indicated, except in a few special cases where individual types are particularly well known or where there are marked differences in shade. We have not given Schultz numbers or pre-war names in any instance, although in a majority of cases we have this information on file.

So far as we know, this is the first attempt which has been made to compile a complete list of American colors. While it is admittedly not 100 per cent complete or accurate, it should at least form the basis for something which can be enlarged and developed in the future. Our main purpose is to supply consumers with a list of American colors presently available and to indicate their original sources. It was not thought necessary to give addresses of manufacturers, as these are well known in practically all instances.

We should have been glad to include products merchandised by dealers but this would have involved a great deal of confusing duplication of type colors, not to mention the countless mixtures upon the market under different names. We trust that our readers will examine carefully the lists as they appear and advise us of any errors or omissions which may be apparent in order that we may correct them at a later date. When the entire list is complete it is possible that we may publish it in booklet form, if the demand seems sufficient. In the meantime, however, we suggest that our readers keep the lists, as they appear, in their files for future reference. In the present installment we publish the Acid colors. Other classifications will follow in each succeeding issue until the list is completed.

BLACK

Acid Blue Black
Cincinnati Chemical Works

National Hat Black Regular
National Aniline & Chemical Co.

National Hat Black G
National Aniline & Chemical Co.

National Hat Black 61690
National Aniline & Chemical Co.

National Durol Black B
National Aniline & Chemical Co.

National Durol Black 2B
National Aniline & Chemical Co.

National Buffalo Black RB
National Aniline & Chemical Co.

National Buffalo Black AR
National Aniline & Chemical Co.

National Buffalo Black NBR
National Aniline & Chemical Co.

National Buffalo Black 8B
National Aniline & Chemical Co.

National Buffalo Black 10B
National Aniline & Chemical Co.

National Buffalo Black 3G
National Aniline & Chemical Co.

National Buffalo Black AB
National Aniline & Chemical Co.

National Buffalo Black 2AB
National Aniline & Chemical Co.

National Buffalo Black 4AB
National Aniline & Chemical Co.

National Buffalo Black 5AB
National Aniline & Chemical Co.

National Buffalo Black 2AG
National Aniline & Chemical Co.

National Buffalo Black SB
National Aniline & Chemical Co.

National Buffalo Black 2SB
National Aniline & Chemical Co.

National Buffalo Black 4SB
National Aniline & Chemical Co.

National Buffalo Black 6SB
National Aniline & Chemical Co.

National Buffalo Black 2SG
National Aniline & Chemical Co.

National Buffalo Black 6AB
National Aniline & Chemical Co.

Newport Acid Black 4AN
Newport Chemical Works, Inc.

Newport Acid Jet Black BX Conc.
Newport Chemical Works, Inc.

Newport Acid Blue Black Conc.
Newport Chemical Works, Inc.

Newport Fast Acid Black N2B
Newport Chemical Works, Inc.

Newport Naphthylamine Black V
Newport Chemical Works, Inc.

Newport Wool Black B
Newport Chemical Works, Inc.

Newport Acid Blue Black Ex. Conc.
Newport Chemical Works, Inc.

Newport Fast Silk Grey M Conc.
Newport Chemical Works, Inc.

Pontacyl Black BX
E. I. du Pont de Nemours & Co.

Pontacyl Black 4BX
E. I. du Pont de Nemours & Co.

Pontacyl Blue Black SX
E. I. du Pont de Nemours & Co.

Pontacyl Silk Black M
E. I. du Pont de Nemours & Co.

Empire Acid Black
Palatine Aniline & Chemical Corp.

Naphthol Blue Black
Central Dyestuff & Chemical Co.

Perfection Wool Black
John Campbell & Co.

Aceko Black 10B
John Campbell & Co.

Aceko Black R
John Campbell & Co.

Acid Blue Black Ex. Conc.
The Sherwin-Williams Co.

Amacid Blue Black KN Conc.
American Aniline Products, Inc.

Acid Black 10B
Noil Chemical & Color Works, Inc.

Acid Black 10BX
Noil Chemical & Color Works, Inc.

Acid Blue Black G
Butterworth-Judson Corp.

Acid Blue Black G Conc.
Butterworth-Judson Corp.

Sulphon Cyanine Black BA
Grasselli Chemical Co.

Sulphon Fast Black A
Grasselli Chemical Co.

Naphthylamine Black D
Grasselli Chemical Co.

Naphthylamine Black 10B
Grasselli Chemical Co.

BLUE

Newport Alkali Blue B Powder
Newport Chemical Works, Inc.

Alkali Blue R & G
The Sherwin-Williams Co.

Alkali Blue
New York Color & Chemical Co.

Alkali Blue
Cincinnati Chemical Works

Alkali Blue
Radiant Dye & Color Works

Alkali Blue R
Dicks David Co.

Alkali Blue 4B
Dicks David Co.

National Alkali Blue B
National Aniline & Chemical Co.

National Pure Soluble Blue B
National Aniline & Chemical Co.

National Pure Soluble Blue A
National Aniline & Chemical Co.

National Wool Navy B
National Aniline & Chemical Co.

National Navy Blue A7473
National Aniline & Chemical Co.

National Hat Blue VF Conc.
National Aniline & Chemical Co.

National Brilliant Wool Blue N
National Aniline & Chemical Co.

National Wool Blue CG
National Aniline & Chemical Co.

National Alphazurine A
National Aniline & Chemical Co.

National Alphazurine 2G
National Aniline & Chemical Co.

National Alphazurine FG
National Aniline & Chemical Co.

National Alphazurine R
National Aniline & Chemical Co.

National Indigotine
National Aniline & Chemical Co.

National Induline NT
National Aniline & Chemical Co.

National Fast Wool Blue B
National Aniline & Chemical Co.

National Fast Wool Blue R
National Aniline & Chemical Co.

National Fast Wool Cyanone R
National Aniline & Chemical Co.

National Fast Wool Cyanone 3R
National Aniline & Chemical Co.

Soluble Blue
Cincinnati Chemical Works

Ethonic Fast Blue BR Conc.
John Campbell & Co.

Aceko Fast Blue 2R
John Campbell & Co.

Aceko Cyanine 3R Extra
John Campbell & Co.

Aceko Cyanine 5R Extra
John Campbell & Co.

Newport Acid Blue R
Newport Chemical Works, Inc.

Newport Acid Blue GR Conc.
Newport Chemical Works, Inc.

Newport Acid Blue LDG
Newport Chemical Works, Inc.

Newport Acid Blue LDR
Newport Chemical Works, Inc.

Newport Wool Blue MB
Newport Chemical Works, Inc.

Newport Neutral Wool Blue RG
Newport Chemical Works, Inc.

Newport Fast Wool Cyanone 3R
Newport Chemical Works, Inc.

Newport Silk Blue R
Newport Chemical Works, Inc.

Naphthol Blue 3R
American Aniline Products, Inc.

Calco Acid Brilliant Blue G
Calco Chemical Co.

Sulfone Acid Blue B
Grasselli Chemical Co.

Sulphon Acid Blue R
Grasselli Chemical Co.

Sulphon Cyanine 5R
Grasselli Chemical Co.

Induline—Water Soluble
Grasselli Chemical Co.

Aniline Blue
New York Color & Chemical Co.

Water Blue 6B
New York Color & Chemical Co.

Soluble Blue 2B
New York Color & Chemical Co.

Soluble Blue 4B
New York Color & Chemical Co.

Soluble Blue R
New York Color & Chemical Co.

Soluble Blue 3R
New York Color & Chemical Co.

Aniline Blue
Radiant Dye & Color Works

Soluble Blue 2G
Dicks David Co.

Soluble Blue 2B
Dicks David Co.

Soluble Blue 2R
Dicks David Co.

Soluble Blue 5R
Dicks David Co.

Soluble Blue E
Dicks David Co.

Synthetic Indigotine
Atlas Color Works

Synthetic Indigo Extract
Atlas Color Works

Atlantole Wool Blue B
Atlantic Dyestuff Co.

Du Pont Soluble Blue R
E. I. du Pont de Nemours & Co.

Du Pont Soluble Blue 3R
E. I. du Pont de Nemours & Co.

Pontacyl Sulfon Blue 5R Conc.
E. I. du Pont de Nemours & Co.

BROWN

Amacid Fast Brown G
American Aniline Products, Inc.

Fast Brown R
Grasselli Chemical Co.

Aceko Phosphine G
John Campbell & Co.

Aceko Dark Brown RD
John Campbell & Co.

Resorcin Brown
Palatine Aniline & Chemical Corp.

National Resorcin Brown RN
National Aniline & Chemical Co.

National Resorcin Brown R
National Aniline & Chemical Co.

National Hat Brown BN
National Aniline & Chemical Co.

GREEN

Ethonic Fast Green B
John Campbell & Co.

New Fast Acid Green
John Campbell & Co.

Ethonic Fast Green 3G
John Campbell & Co.

Wool Green BS
Grasselli Chemical Co.

Dyelene Naphthol Green
Dye Products & Chemical Co., Inc.

Dyelene Acid Green G
Dye Products & Chemical Co., Inc.

Newport Wool Green SAN
Newport Chemical Works, Inc.

Newport Acid Green B Conc.
Newport Chemical Works, Inc.

Newport Fast Milling Green B
Newport Chemical Works, Inc.

Newport Naphthol Green
Newport Chemical Works, Inc.

Newport Azo Dark Green B
Newport Chemical Works, Inc.

Pontacyl Dark Green T
E. I. du Pont de Nemours & Co.

Pontacyl Green B
E. I. du Pont de Nemours & Co.

Pontacyl Green S Extra
E. I. du Pont de Nemours & Co.

National Acid Green L Extra
National Aniline & Chemical Co.

National Fast Acid Green B
National Aniline & Chemical Co.

National Wool Green S
National Aniline & Chemical Co.

ORANGE

Brilliant Orange 4GR
The Sherwin-Williams Co.

Orange GG
The Sherwin-Williams Co.

Brilliant Orange RR
The Sherwin-Williams Co.

Orange Y
The Sherwin-Williams Co.

Orange G
Central Dyestuff & Chemical Co.

Orange X
Central Dyestuff & Chemical Co.

Orange Y
Central Dyestuff & Chemical Co.

Orange I
Central Dyestuff & Chemical Co.

Orange R
Central Dyestuff & Chemical Co.

Du Pont Orange G
E. I. du Pont de Nemours & Co.

Du Pont Orange II Conc.
E. I. du Pont de Nemours & Co.

Du Pont Orange RO
E. I. du Pont de Nemours & Co.

Calco Acid Orange A
Calco Chemical Co.

Calco Fast Acid Orange 2G
Calco Chemical Co.

Calco Acid Orange II
Calco Chemical Co.

Calco Acid Orange Y
Calco Chemical Co.

Orange II
New York Color & Chemical Co.

Orange II
Grasselli Chemical Co.

Amacid Orange Y
American Aniline Products, Inc.

Amacid Orange RD Conc.
American Aniline Products, Inc.

Empire Fast Orange
Palatine Aniline & Chemical Corp.

Ethonic Fast Orange G
John Campbell & Co.

Aceko Orange II
John Campbell & Co.

Aceko Brilliant Orange R
John Campbell & Co.

Newport Orange A
Newport Chemical Works, Inc.

Newport Orange GG Conc.
Newport Chemical Works, Inc.

National Croceine Orange Y Conc.
National Aniline & Chemical Co.

National Wool Orange 2G Crystals
National Aniline & Chemical Co.

National Wool Orange R Conc.
National Aniline & Chemical Co.

National Wool Orange A Conc.
National Aniline & Chemical Co.

Orange Y
Cincinnati Chemical Works

RED

Amaranth
Central Dyestuff & Chemical Co.

Amaranth
Cincinnati Chemical Works

Newport Amaranth
Newport Chemical Works, Inc.

Pontacyl Amaranth
E. I. du Pont de Nemours & Co.

Newport Azo Eosine G
Newport Chemical Works, Inc.

Newport Azo Eosine 2B
Newport Chemical Works, Inc.

National Azo Rubine Extra
National Aniline & Chemical Co.

Newport Azo Rubine R
Central Dyestuff & Chemical Co.

Azo Rubine R
Newport Chemical Works, Inc.

Pontacyl Ruby G
E. I. du Pont de Nemours & Co.

Bordeaux B
Central Dyestuff & Chemical Co.

Aceko Bordeaux
John Campbell & Co.

Newport Acid Bordeaux B Conc.
Newport Chemical Works, Inc.

National Azo Bordeaux
National Aniline & Chemical Co.

Acid Mauve
Cincinnati Chemical Works

Ethonic Fast Carmine 5B
John Campbell & Co.

Du Pont Azo Carmine GX
E. I. du Pont de Nemours & Co.

Pontacyl Carmine 2B
E. I. du Pont de Nemours & Co.

Pontacyl Carmine 6B
E. I. du Pont de Nemours & Co.

Pontacyl Carmine 2G
E. I. du Pont de Nemours & Co.

Carmoisine
Central Dyestuff & Chemical Co.

Carmoisine
Cincinnati Chemical Works

Carmoisine
Grasselli Chemical Co.

National Fast Crimson R
National Aniline & Chemical Co.

National Fast Crimson 6BL
National Aniline & Chemical Co.

National Fast Crimson GR
National Aniline & Chemical Co.

Brilliant Crimson No. 10
The Sherwin-Williams Co.

Azo Crimson L
Grasselli Chemical Co.

Erythrine
Central Dyestuff & Chemical Co.

National Fast Fuchsine G
National Aniline & Chemical Co.

National Fast Fuchsine 6B
National Aniline & Chemical Co.

National Acid Fuchsine D
National Aniline & Chemical Co.

Azo Fuchsine 6B
Grasselli Chemical Co.

Azo Fuchsine
Central Dyestuff & Chemical Co.

Amacid Fuchsine 4B
American Aniline Products, Inc.

Newport Acid Fuchsine
Newport Chemical Works, Inc.

Newport Lana Fuchsine B
Newport Chemical Works, Inc.

Lanafuchsine
The Sherwin-Williams Co.

National Acid Magenta N
National Aniline & Chemical Co.

Newport Acid Magenta BR
Newport Chemical Works, Inc.

Azo Phloxine GA
Grasselli Chemical Co.

Newport Acid Phloxine GR
Newport Chemical Works, Inc.

Newport Acid Phloxine G
Newport Chemical Works, Inc.

Newport Acid Phloxine 6B
Newport Chemical Works, Inc.

National Ponceau R
National Aniline & Chemical Co.

Dyelene Ponceau 3RB
Dye Products & Chemical Co., Inc.

Ponceau 5R
The Sherwin-Williams Co.

Newport Acid Red 2B Extra
Newport Chemical Works, Inc.

Newport Acid Red 6B Extra
Newport Chemical Works, Inc.

Newport Acid Red OTH
Newport Chemical Works, Inc.

Brilliant Red G
Cincinnati Chemical Works

Pontacyl Cloth Red 3G
E. I. du Pont de Nemours & Co.

Cloth Red BC
Grasselli Chemical Co.

National Cloth Red B
National Aniline & Chemical Co.

National Cloth Red R
National Aniline & Chemical Co.

National Cloth Red G
National Aniline & Chemical Co.

Cloth Red G
Cincinnati Chemical Works

Fast Red P
Grasselli Chemical Co.

Fast Red 6B Extra
The Sherwin-Williams Co.

Ethonic Fast Red G
John Campbell & Co.

Aceko Fast Red E
John Campbell & Co.

Pontacyl Fast Red A
E. I. du Pont de Nemours & Co.

Calco Fast Red A
Calco Chemical Co.

Newport Fast Red A
Newport Chemical Works, Inc.

Fast Red A
The Sherwin-Williams Co.

Aceko Fast Red A
John Campbell & Co.

Empire Fast Red
Palatine Aniline & Chemical Corp.

Fast Red A
Central Dyestuff & Chemical Co.

Fast Red B
Central Dyestuff & Chemical Co.

Fast Red A
Cincinnati Chemical Works

National Fast Red S Conc.
National Aniline & Chemical Co.

National Hat Red
National Aniline & Chemical Co.

National Wool Red 40F
National Aniline & Chemical Co.

Newport Roccelline
Newport Chemical Works, Inc.

Aceko Brilliant Scarlet
John Campbell & Co.

Aceko Scarlet 2R
John Campbell & Co.

Dyelene Cloth Scarlet G
Dye Products & Chemical Co., Inc.

Newport Acid Scarlet 2R
Newport Chemical Works, Inc.

National Brilliant Scarlet 3R
National Aniline & Chemical Co.

National Lake Scarlet R
National Aniline & Chemical Co.

National Wool Scarlet BR
National Aniline & Chemical Co.

Scarlet 2R
Central Dyestuff & Chemical Co.

Scarlet 4R
Central Dyestuff & Chemical Co.

Scarlet 2RR
The Sherwin-Williams Co.

Scarlet 2RRB
The Sherwin-Williams Co.

Scarlet 2RG
The Sherwin-Williams Co.

Calco Lake Scarlet 2R
Calco Chemical Co.

Calco Lake Scarlet 3RX
Calco Chemical Co.

Calco Acid Scarlet 2R
Calco Chemical Co.

Calco Acid Scarlet RX
Calco Chemical Co.

Calco Acid Scarlet 3RX
Calco Chemical Co.

Du Pont Scarlet 2RL Conc.
E. I. du Pont de Nemours & Co.

Pontacyl Scarlet RR
E. I. du Pont de Nemours & Co.

Du Pont Scarlet 3RL
E. I. du Pont de Nemours & Co.

Du Pont Scarlet 3RL Conc.
E. I. du Pont de Nemours & Co.

Scarlet 2R
Cincinnati Chemical Works

Newport Croceine Scarlet 3BX
Newport Chemical Works, Inc.

Newport Croceine Scarlet MOO
Newport Chemical Works, Inc.

Crocein Scarlet MOO
The Sherwin-Williams Co.

National Croceine Scarlet MOO
National Aniline & Chemical Co.

Croceine Scarlet 3BX
Cincinnati Chemical Works

VIOLET

Acid Violet 8BL
Butterworth-Judson Corp.

Newport Acid Violet 6R
Newport Chemical Works, Inc.

Newport Acid Violet 4BS
Newport Chemical Works, Inc.

Newport Acid Violet 4BM
Newport Chemical Works, Inc.

Newport Acid Violet 5B Conc.
Newport Chemical Works, Inc.

Newport Fast Acid Violet 10B
Newport Chemical Works, Inc.

National Hat Violet A8421
National Aniline & Chemical Co.

National Wool Violet 4BN
National Aniline & Chemical Co.

National Azo Wool Violet 4B
National Aniline & Chemical Co.

National Acid Fast Violet 12B
National Aniline & Chemical Co.

National Fast Wool Violet B
National Aniline & Chemical Co.

National Acid Fast Violet BG
National Aniline & Chemical Co.

Dyelene Acid Violet 4BS
Dye Products & Chemical Co., Inc.

Pontacyl Sulfon Violet R
E. I. du Pont de Nemours & Co.

Pontacyl Violet C4B
E. I. du Pont de Nemours & Co.

Pontacyl Violet 6BN
E. I. du Pont de Nemours & Co.

Pontacyl Violet RL
E. I. du Pont de Nemours & Co.

Pontacyl Fast Violet 10B
E. I. du Pont de Nemours & Co.

Du Pont Violamine B
E. I. du Pont de Nemours & Co.

Du Pont Violamine R
E. I. du Pont de Nemours & Co.

Ethonic Fast Violet 2RL
John Campbell & Co.

Victoria Fast Violet 2R Ex.
Grasselli Chemical Co.

YELLOW

Dyelene Azo Yellow
Dye Products & Chemical Co., Inc.

Dyelene Acid Yellow G
Dye Products & Chemical Co., Inc.

Fast Light Yellow 2G
Grasselli Chemical Co.

Fast Light Yellow 3G
Grasselli Chemical Co.

Indian Yellow G
Grasselli Chemical Co.

Newport Chinoline Yellow
Newport Chemical Works, Inc.

Newport Azo Yellow Conc.
Newport Chemical Works, Inc.

Newport Naphthol Yellow S
Newport Chemical Works, Inc.

Newport Fast Yellow GL
Newport Chemical Works, Inc.

Newport Fast Wool Yellow G
Newport Chemical Works, Inc.

Newport Fast Light Yellow 2G
Newport Chemical Works, Inc.

National Azo Yellow A5W
National Aniline & Chemical Co.

National Quinoline Yellow
National Aniline & Chemical Co.

National Wool Yellow Ex. Conc.
National Aniline & Chemical Co.

National Fast Wool Yellow 3G
National Aniline & Chemical Co.

Pontacyl Light Yellow GG
E. I. du Pont de Nemours & Co.

Pontacyl Fast Yellow Y
E. I. du Pont de Nemours & Co.

Fast Light Yellow G2X
Pharma-Chemical Corp.

Fast Light Yellow G3X
Pharma-Chemical Corp.

Fast Light Yellow "Silk Special"
Pharma-Chemical Corp.

Fast Light Yellow XXX
Pharma-Chemical Corp.

Wool Yellow Special
Pharma-Chemical Corp.

Metanil Yellow
Cincinnati Chemical Works

Newport Metanil Yellow
Newport Chemical Works, Inc.

National Metanil Yellow 1955
National Aniline & Chemical Co.

Metanil Yellow
Grasselli Chemical Co.

Metanil Yellow Conc.
Dicks David Company

Dyelene Metanil Yellow
Dye Products & Chemical Co., Inc.

Du Pont Metanil Yellow
E. I. du Pont de Nemours & Co.

Du Pont Metanil Yellow Conc.
E. I. du Pont de Nemours & Co.

Tartrazine XXX Ex. Conc.
Pharma-Chemical Corp.

Tartrazine
Texdel Chemical Co., Inc.

Tartrazine SE
Grasselli Chemical Co.

Calco Tartrazine RX
Calco Chemical Co.

Notes on the Dyeing of Direct Blacks on Cotton Piece Goods

Part III

Difficulties in Dyeing Grays — A Continuous Dyeing Plant for Grays — Construction, Operation and Advantages—Construction and Operation of Plant Making Rinse Unnecessary —Plant for Dyeing Very Light Shades

By RAFFAELE SANSONE

The Dyeing of Grays

DIRECT black coloring matters are of great importance for the production of grays for the following reasons:

1. A great variety of shades can be produced through their means, with or without a very small quantity of a shading coloring matter, which can often be another direct black.

2. Shades of sufficient fastness for many purposes can be obtained with the greatest ease even without salt, and through any dyeing means at present in use in the works for dyeing blacks or other colors.

3. In some works the old dye baths left from the dyeing of direct blacks can be utilized for their production, greatly economizing on the coloring matter used.

4. Some direct blacks, through diazotization, produce grays of very satisfactory shades and fastness (Direct Black BH, etc.).

Besides the above, although direct blacks have been substituted in many cases by the faster sulphur coloring matters, or by aniline black, the grays obtained from many of the same still hold their ground strongly, owing to their great convenience and ease of application.

Difficulties in Dyeing Grays

The dyeing of direct grays is no easy task, for it is often very difficult to imitate exactly a given shade. Moreover it is very easy to overstep the coloring intensity desired, or, to the contrary, to not reach it, owing to the great sensitiveness and very large number of gradations that can be produced from a white cloth to a medium gray with the same color, or with small additions of matching colors; a very small variance producing often a very excellent or a very ugly shade. For such reasons the same ability is required in this instance on the part of the matcher and dyer as with any other light shade, and often even more, owing to the great variety of the grays that are often fashionable.

For the production of one of the simplest grays, some dyers treat the cotton material with a bath containing

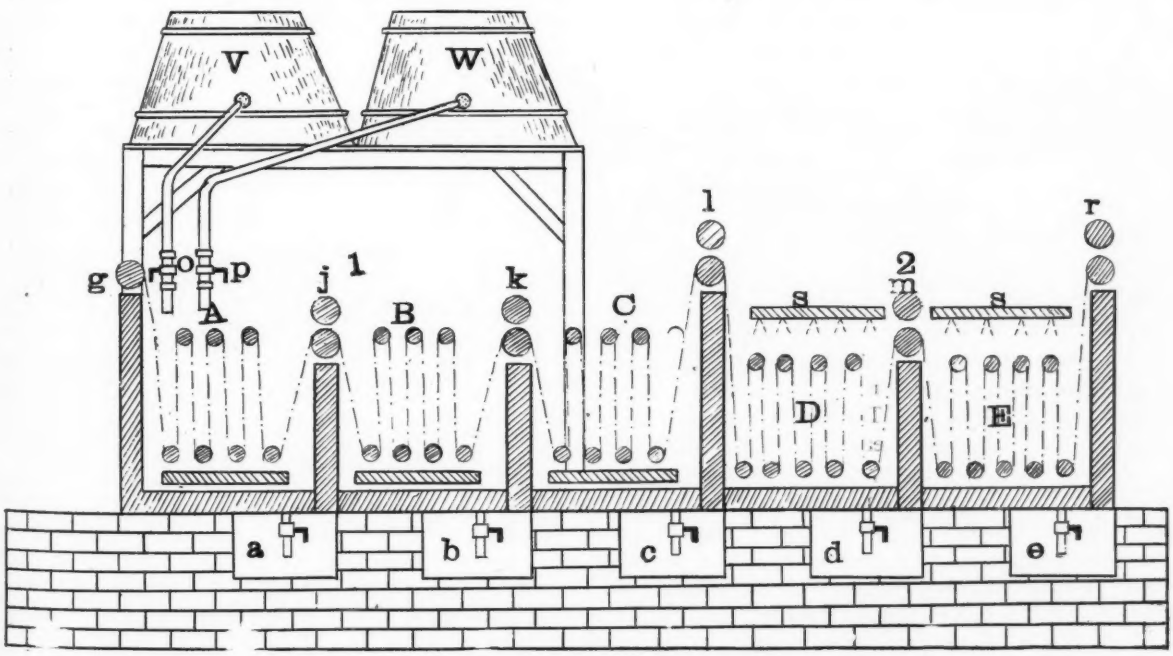

FIG. 1—*Plant for Continuous Dyeing*

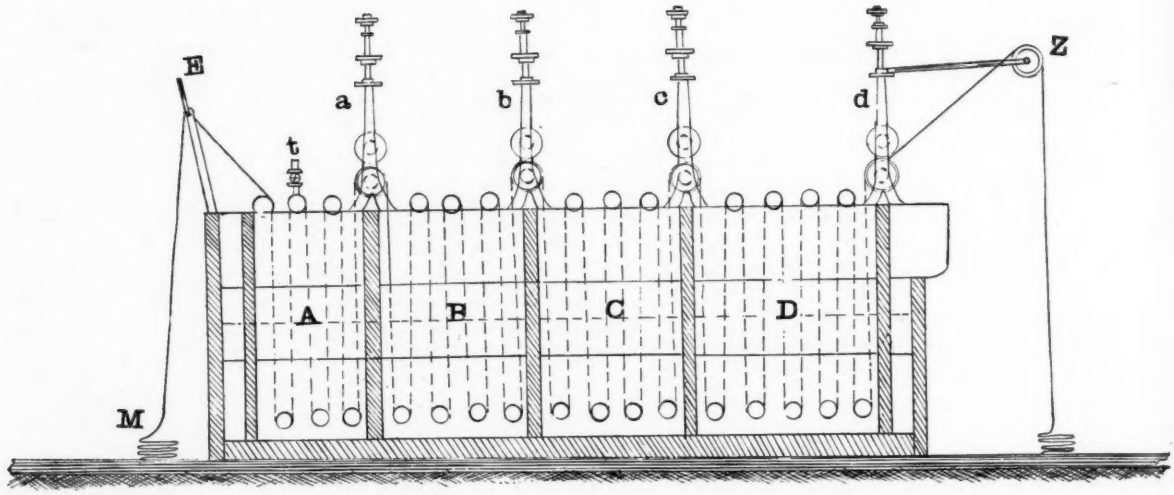

FIG. 2—*Plant to Do Away with Final Rinse After Dyeing*

from 1 to 2 per cent of the direct black (and no salt or carbonate of soda) on the jigger at the boil, giving from four to five passages, and then in the cooling bath giving two or three passages, rinsing after this, drying and finishing; storing away the dye bath in a separate iron tank ready for the treatment of other material, or using it, after a degree of strengthening through the addition of a more concentrated solution, for the treatment of other batches of material, either in the same or in a lighter or darker gradation. The dyed material is treated on leaving the jigger either on another jigger with rinsing water, or on a continuous washer.

Since the introduction of mechanical dyeing apparatus of better yield than the jigger, the above method of procedure is only of value for small-scale production. For dyeing grays on a large scale with a fair margin it is, however, necessary to conduct this more continuously and rapidly, economizing as much as possible on space, steam and motive power—something which is difficult even with a large battery of jiggers. The best means at disposal for the purpose is the continuous dyeing machine.

A CONTINUOUS DYEING PLANT

A continuous dyeing plant which, when properly worked, gives very satisfactory results as far as yield and pureness of shade is concerned, is shown in *Fig.* 1.

This shows a long vat of wood, or of iron lined with glass, divided into a dyeing compartment (1), and into a rinsing compartment (2). The first has three compartments (A, B, C), three steam coils, three series of upper and lower guiding rollers, three pairs of squeezing rollers (j, k, l), and a guiding-in roller (g).

Each compartment has on its bottom a tap (a, b, c), leading to a collection or strengthening vat at the back of the plant, from which the waste dye bath can be pumped up to one of the two half-tubs (V and W) destined to the storage of the coloring matter solution, to be run in during the working of the plant, and which enters through the respective tubes and taps (o and p).

The second division of the vat contains two compartments (D and E), a series of upper and lower guiding rollers, and two pairs of pressing rollers (m, r); the bottom of such compartments has a running-off tap, indicated by d and e in each case. Two multiple sprinklers (S, S) are fixed above the upper guiding rollers, and these spray uniformly on the material passing through clean running water, freeing this of all unfixed coloring matter.

OPERATION OF THE PLANT

The working of the plant requires some attention, for it is very easy, either through an unnecessary increase, or through a reduction in the speed, or passage, of the fabric through the machine, to obtain lighter or darker shades than those required, thereby producing shades which cannot be sold and have to be redyed in black or in another color.

The workmen, after having passed a long cotton tape or band on the different double series of guiding rollers, and through the pressing rollers (j, k, l, m, r), prepare the dye bath in a double walled kettle at the back of the plant, not shown in the sketch, and then run this into one of the storage half-tubs (V, W); one of the taps below these (o or p) being opened for running the dye liquor into the first compartment (A) and from here into the following compartments (B and C), arriving in all three divisions to a certain height, at which it escapes through an overflow tube.

When the dye bath passes through regularly, rinsing water is caused to run in the compartments that follow (D and E), keeping the bath in these as high as possible, and the mechanism driving the plant is placed in movement for beginning the dyeing operation. The cotton

(*Continued on page* 295.)

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DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

LOUIS A. OLNEY
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Managing Editor

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OUR FIFTH ANNIVERSARY

WITH this issue, The AMERICAN DYESTUFF REPORTER completes the fifth year of its existence. Five years is not a long time in the life of a nation, an industry, or even a publication, but it represents, nevertheless, a distinct line of demarcation, a milestone, so to speak; a convenient point upon which to pause and look back briefly over the events which have figured in an exceedingly busy half-decade. And in the case of The REPORTER, it represents the successful vindication of a belief that there was a legitimate field for a medium serving the dye-making industry by an expression of its views, and the dye-consuming industry by the dissemination of information regarding its sources of supply.

October 8, 1917, the first issue of this publication came from the press as a small weekly of sixteen pages with the slogan "Circulating Everywhere Dyestuffs Are Used" at its mast-head. We cull the following from its announcement on page 1:

"It aims to establish a closer association—a better understanding—among all elements of this newest of American industries. Its mission is worthy; with your help it can succeed. . . . The best interests of both consumers and manufacturers can be served if a spirit of trust, confidence and mutual helpfulness can be established between all parties at interest. To foster such a spirit is the foremost aim of The AMERICAN DYESTUFF REPORTER."

The little weekly began its life frankly as a news and propaganda paper, devoted to expressing the needs of the dye manufacturers and the service which they owed consumers. Some of its articles were technical, but emphasis was laid particularly upon anything which expounded and clarified either of the two points above referred to. It is significant, therefore, that the very first issue carried an article entitled "Chemistry as a Tariff Problem," by William S. Culbertson of the U. S. Tariff Commission.

"The American Dye Industry: Its Establishment and Protection," featured the second number, and thenceforward the issue which was to play the leading part in the editorial policies of The REPORTER, as well as in the affairs of the dye industry itself, began to grow and take shape until it had assumed a dominant position.

With the number brought out on July 1, 1918, The REPORTER, which had hitherto been published by the Hewitt Publishing Corporation, passed into the hands of A. P. Howes, its present owner and publisher, and with that number came the announcement of policies which have been rigidly adhered to ever since. As therein stated, they were:

"To devote The REPORTER wholeheartedly to the development of a permanent domestic dyestuff industry in America.

"To advocate everything which will expedite this development and oppose everything which will retard it.

"To eradicate the widely held conviction among consumers and the general public that American dyes are at best 'makeshifts.'

"To expose and condemn everything in this industry which smacks of German propaganda.

"To stimulate co-operation and mutual helpfulness between manufacturers and consumers.

"To foster a spirit of tolerance on the part of consumers with the efforts which manufacturers are making to supply their needs.

"To advocate such tariff or other legislation as may be essential to the welfare of the industry.

"To encourage constructive co-operation and discourage destructive competition between manufacturers, both large and small.

"To make our circulation cover every field which consumes dyestuffs and to supply these consumers promptly with authentic information regarding the development of American colors and the most approved methods of their use."

How well these policies have been lived up to we leave it to readers who have followed our fortunes during the past five years to judge.

How great is the need for a vigorous prosecution of these self-same policies to-day, we likewise submit to readers for judgment.

Shortly after the above number appeared, the little weekly acquired the dignity of a cover, but beyond this, with the exception of occasional special issues, it remained the same in size and scope until August, 1920, when it inaugurated a Technical Section, 9x12 inches, appearing once a month as an integral part of the publication. And at the time of this expansion The REPORTER was fortunate in securing the services of Professor Louis A. Olney as advisory editor. His country-wide prominence in the application field, his unquestioned competence to pass upon technical matters, and his influence, all combined to give assurance of accuracy, judgment in selection, and the opportunity for securing material not always otherwise available.

From then on, original technical articles devoted to the application of dyestuffs and the machinery incidental thereto were featured exclusively in the Monthly Technical Section, while the weekly continued to give the news of the industry, coupled with leading articles devoted to the cause of the dye industry. For seventeen months this policy was continued, until, in the issue of December 5, 1921, appeared the announcement of the decision of the newly organized American Association of Textile Chemists and Colorists to make use of The Reporter for printing the Proceedings of this association. It was then determined that the weekly should be dropped, that its principle features should be incorporated with the hitherto Monthly Technical Section, and that the latter, retaining its size and general make-up, and carrying the Proceedings of the A. A. T. C. C., should be issued biweekly. With the issue of January 1, 1922, this policy was put into effect with the result that an ideal medium for the service of both dye manufacturers and consumers came into being. That this should be the best arrangement, both as to frequency of issue and balance of text features, was at that time no longer a conjecture nor a good guess. It was a mathematical certainty arising from numerous changes and experiments over a period of four years, a conclusion arrived at by the actual "trial and error" method to determine the exact service required by the industries involved.

The final bar to making that service all that we would have it has been the difficulty encountered in securing from American writers a sufficient number of technical articles devoted to the application of dyestuffs. This problem is not as great as it was in the beginning, and shows signs of working toward an ultimate solution. We have at all times endeavored to present the best articles appearing in the foreign journals, but The American Dyestuff Reporter, as its name indicates, is designed for the use and expression of the American industry, and right here a plea is entered for more activity on the part of application men in *all* branches of the coloring industry to come forward and contribute, for the good of the industry as a whole, the results of their experience.

When the now historic struggle for adequate dye protection was opened in May, 1919, by the introduction of the Longworth bill in the House, The Reporter had for months been at the very forefront in its advocacy of drastic measures. While its taste in so constantly reiterating this single point may at times have been questioned—by opposers—its boldness and vigor never were, and throughout the struggle it has consistently maintained its position to the present day. Week after week, issue after issue, it never let up. Never for a single instant was anyone left in uncertainty as to just where it stood. Undoubtedly it caused some resentment among consumers who misunderstood its real aims. Undoubtedly, however, it made converts. Undoubtedly it exercised an influence upon journals in the field which had been lukewarm or indifferent; and again, undoubtedly it did contribute useful support to the cause before the fight was terminated.

Its policy, formulated long before the first Longworth bill was introduced or even framed, was, briefly stated, that it is possible to devise legislation which will give adequate protection to American dye manufacturers without injuring the consumers. Whatever plan was suggested, The Reporter advocated in lieu of something better, but remained on the constant lookout for improvements. When such appeared, they were instantly set up as new ideals to work for, always with the fundamental idea that action of some sort was imperative, that it was better for consumers to see the dye industry placed in a position where it could begin expensive and exhaustive research than to have it constantly harried and "in the air," and that once given adequate protection, minor injustices could afterwards be eliminated to the entire satisfaction of all parties concerned.

This policy is here restated because it has been misrepresented on more than one occasion by persons connected with other publications, and others active in the industry, during the past few years.

In its efforts to stimulate activity in behalf of such legislation, The Reporter has been untiring, and these efforts, cheerfully and wholeheartedly given, are its proudest contribution to the American dye industry.

It remains but to add that they will not be relaxed. Editorially and in every other way possible we shall consistently endeavor to point out what the best interests of producers and consumers of dyestuffs demand.

On this, our fifth anniversary, we thank our readers for their support and loyalty, and ask that they will do even more during the next five years to help us give them only the best in technical and educational text matter.

L. T. C.

THE NEED OF THE HOUR

INQUIRY made at the office of the Customs Appraiser for the Port of New York shortly before this issue went to press revealed the fact that a certain amount of competing foreign dyestuffs was being admitted under the American valuation plan, although no detailed statement was available. The official interviewed made it clear that his department interpreted the intent of the law to be to protect American-made products and that his department aimed to enforce the law rigidly.

In attempting to determine the American sales price of a dyestuff seeking entry the Customs Department has endeavored to obtain current sales prices of similar products from American manufacturers, dealers and importers, and to strike an average between them. The Department admits, however, that it is greatly handicapped by the lack of experienced technical men in determining whether or not dyestuffs seeking entry are identical with American-made products and whether their relative strengths are similar. The Department does not feel that it has sufficient resources to enable it to set up a bureau which will be properly qualified to pass upon all import questions. It be-

lieves that the purport of the law is to protect the American manufacturers, and that since they are the chief beneficiaries the burden of maintaining a properly qualified bureau might reasonably rest with them. If such a bureau were set up by the manufacturers the Department would be glad to co-operate with it to the fullest extent possible.

Steps in this direction have already been taken by some of the manufacturers, and it is The REPORTER'S belief that the importance of this work cannot be overemphasized. We believe that American manufacturers, either as individuals or preferably through their Association, should immediately set up an advisory bureau at whose head there should be a man of sufficient experience with dyestuff matters to enable him to direct its work efficiently and whose qualifications and record are such as to lend weight to the reports made by his office and to inspire confidence in the minds of both manufacturers and importers. Unless the American dyestuff manufacturers take it upon themselves to see that every co-operation is lent to the Government in its efforts to enforce the law rigorously it is difficult to see who can be expected to do so.

We hear some manufacturers bewailing the probable effects of the present law upon their business and discussing the possibility of putting through additional legislation at the next session of Congress. This is all very well for the future, but the need of to-day is proper enforcement of the protection already granted. In our opinion there is nothing of more immediate importance to our American dyestuff manufacturers, and the quicker they act to assist the Government in its announced intention to get all the protection possible out of the present law, the better are their chances of competing successfully with imported goods.

HERMAN A. METZ

ELSEWHERE in this issue will be found a news item relative to the nomination for Congress of Herman A. Metz, on the Democratic ticket, in the 17th Congressional District, New York City. Although it is unlikely that any considerable number of the voters in this district have very positive opinions in regard to dyestuff matters, it would seem, nevertheless, that in view of his candidacy some reference to his activities in this matter and some comment upon him personally might be in order.

As is well known to REPORTER readers, Colonel Metz has been among the most active opponents of embargo legislation and has unquestionably done a great deal to prevent the adoption of such legislation—legislation which the REPORTER, in common with most persons who are qualified to judge, has believed to be essential to the proper protection of the American dyestuff manufacturing industry.

While the REPORTER has consistently opposed Colonel Metz's views on the embargo question, we believe that it is only fair to him to state that, in our opinion, his position in this matter has been the excuse for venting upon him considerable personal animosity by certain individuals who were endeavoring to procure embargo legislation and with whose views on the subject at issue, but not in their personal attacks upon Colonel Metz, the REPORTER has been in hearty accord.

The REPORTER believes that Colonel Metz has been sincere in his expressed belief that high duties alone would be sufficient to protect the American dyestuff manufacturing industry. We do not agree with him in this belief—in fact, we are quite certain he is wrong—but neither do we believe that he has cloaked a desire to ruin the American dyestuff industry under a pretense of protecting the dyestuff consumer. It is our belief that in all cases where in his honest opinion the interests of America and of Germany clashed, he has unhesitatingly put America first. It is also our belief that from a financial standpoint his personal interests are more closely identified with the preservation of his dyestuff manufacturing plants in America than they are with the continuance of his association with the German concerns which he represents.

By what we have said above we do not, for a moment, wish to be understood to have weakened in any way in our earnest belief that the American dyestuff manufacturing industry should be protected at all costs. Whatever sacrifices may be necessary on the part of dyestuff consumers to insure the preservation of this essential key industry ought to be made cheerfully and in a spirit of robust patriotism. We believe that in the long run these sacrifices will prove to have been comparatively insignificant, but even were they ten times what they appear to be at the moment they should, nevertheless, unhesitatingly be made. We do not believe, however, in personal attacks upon a man simply because he has the courage of his convictions and is outspoken in expressing these convictions even though they be diametrically opposed to our own.

FROM THE OTHER SIDE OF THE FENCE

As readers of The REPORTER are well aware, our position on the question of proper protection for the American dyestuff manufacturing industry has been emphasized in these pages during the past several years. In our issue of September 25, under the editorial caption "The Die Is Cast," we took occasion to express a certain amount of dissatisfaction with the recently passed tariff legislation but to voice the hope that it might prove possible for our dyestuff manufacturers to continue their existence under the protection which it affords.

One of our readers has seen fit to take exception to the greater part of what we said therein. If we were editorially "thin-skinned" we should very quickly have consigned his communication to the dark recesses of our files and taken great pains to make certain that none of our readers became aware of its contents.

Inasmuch, however, as we have a certain sense of humor and believe that a majority of our subscribers will enjoy the document as we did without being unduly prejudiced by its efforts to refute our editorial remarks, we pass it along in toto and without the elimination of a single disparaging phrase. We have the highest regard for the gentleman who penned the remarks in question as an individual but when it comes to his views on dyestuff tariff matters we can state positively and without fear of successful contradiction that he is *non compos mentis*.

Here is the letter. Judge for yourselves:

Boston, Mass., October 2, 1922.

A. P. Howes,
New York, N. Y.

Friend Howes:

Your editorial on "The Die Is Cast" has the earmarks of despondency and evidently was written too soon after the cyclone struck and under a mental hallucination that there would be "no more cakes and ale."

Cheer up! That same element which assured us we could compete with the world a few years ago will rise Phoenixlike from the ashes of "Save the Country in the Event of Another War" and show the stuff it is made of and, even as Schoellkopff survived when this same element was trying to kill him with free dyestuffs, and proving to the satisfaction of the consumer and the "eminent legislators" that a tax on dyestuffs was a tax on the downtrodden workingmen's overalls, so will our dye makers under 60 per cent protection at *American* valuation survive.

It is not of record that a post mortem ever was of any material benefit to the deceased, but its function has been mostly to give some little modicum of satisfaction to the mourning friends and relatives, in that the autopsy decided to a greater or less degree why the status obtained, and set at rest conjecture as to whether it was *felo-de-se* or murder by "a small minority."

"The Die Is Cast" is just a little reckless in that it places on a pedestal Longworth, Ransdell and Frelinghuysen as "clear-thinking loyal Americans," and by inference implies that Reed Smoot, and friends of his way of thinking, are not.

My memory may be at fault, but it is my impression that the Senator from Utah was much in demand some years back when we wanted free German dyestuffs, and I now take off my hat to him for consistency. Seems to me the "clear-thinking" gentleman from Ohio brought a petition to Washington from some fifty consumers of dyestuffs in Ohio in favor of embargo. Take your Textile Directory and find them. No deception in this, but *how much did they consume?* or were they job dyers who use a few ounces of color?

The "small minority which misled and deceived its fellows" is some little joke and must have been culled from Mark Twain.

I respect your views to the fullest, but have you not slopped over with the "American-at-heart" stuff? Patriotism has been worn threadbare and the waving of the flag becomes nauseating as a means to an end and should be relegated to the soap box politician. It is a business matter pure and simple, and if a patriotic proposition, then the much talked of visit to Switzerland to meet the Germans was not in order, was it?

Too bad that the German estimates of cost, which, of course, have been untruthful, should have been accepted in Washington, while all similar figures submitted by us, of course of virgin purity, have not been at all times acceptable.

I hold no brief for any foreigner and have accepted their claims with much salt—a commodity well known to both American and foreign dyestuff men—but, having a very long acquaintance with many who have testified for the American Industry, I would be reluctant to say that they are *salvo pudore* in their handling of the truth, but records do not indicate that they will receive any medals for probity.

The difficulties now surrounding the determining of American valuation are, in my judgment, due largely to the fact that we, U. S. dye makers, have been elastic in our conscience in reporting to the Dye and Chemical Division of the War Trade Board a *truthful* list of what we have made.

We have been "called grafters, liars and other things too horrible for words." Too bad, and reprehensible, but lay not the flattering unction to your soul that we are in position to go into the temple and beat our breasts and thank Providence that "we are not as other men."

Sorry your editorial indicts all who were not with you in the fight, because there are lots of conscientious men who believe as I have always done, that an embargo was bad either for dyestuffs or anything else, and that with a fair protection our people were capable of holding their own. I still believe so, and I firmly believe that the American dyestuff industry will survive under the new tariff and that it is ample and sufficient—if my interpretation of the bill is correct, and this is a wild guess as to what it really does mean.

The weak point, in my judgment, was when the manufacturer went ahead and disregarded the man who ultimately consumed his goods but started a political rather than a business campaign for an embargo, which, had it been granted, would have forced the consumer to take the goods made, and at the price demanded, or go without, and a Cartel was in the making that would have made the much abused foreign Cartel look like a poor and abject imitation. Now shout the "Sherman law," that uninforced provision of an all wise Congress.

If, as you say—in direct contradiction to the spirit of your editorial—"protection—has been granted—to permit competition with Germany in the *major* part of our dyestuff requirements," we have got more than the thin end of the wedge under the industry, and the American energy, American vim, American integrity, American truth, American honesty, American skill and all the other spread-eagleism injected into the flow of argument of the last few years, will surely drive the wedge home and we will be not only selling such chemicals to Germany as we

were before the war, but probably sell them some dyestuffs, too.

I am inclined to agree with you that it is going to be hard for the small manufacturer, as he is somewhat dependent upon his big brother for his bases, and it is not without precedent that big brother has said, "Am I my brother's keeper?" after he had "used him," and history might repeat itself, and if peradventure little brother has at any time bought through devious channels any foreign goods and, having duly mixed them, passed them on to an unsuspecting public as genuine homemade, he may find the way long and weary.

You will note I say "if he has," and I use caution in this as I cannot conceive of any of the Highly Honorable and Immaculately Pure Manufacturers doing this thing, and bear well in mind that "he who doubteth is damned."

When I train my memory over the last few years and recall a lot that has passed under my observation, I cannot but truly feel that, taking into the accounting the methods employed and the disposition to ignore the customer without whom the business is not possible, the American dyestuff manufacturer has got off very well, but it will take some little Sapolio to put an entirely clear luster on his coat of arms and I would hardly say that either side to the controversy has set a shining example to posterity, and I sincerely hope the records of this fight will be debarred from the public schools.

The millennium is not yet and probably neither you nor the writer will live to see the day when the wheels of ambition are not greased with the "three-in-one oil" of envy, hatred and malice, and when love of country will be considered too sacred a matter to commercialize in order to attain one's end.

Hasten the day when patriotism is placed in the rank of virtue and not made a camouflage to hide commercial ambitions.

Yours sincerely,

W. H. FIELDHOUSE.

P. S.—I note you take a parting shot at Moses. At least you must give him credit for representing the interests of a dyestuff consuming community, while on the other hand the Senator from the Cactus State who got so active towards the last might be forgiven if he thought "Methylene Blues" indicated a new jazz tune and made a call on his local store for the "record."

W. H. F.

F. E. ATTEAUX TENDERED DINNER; HAS BEEN FORTY YEARS IN DYE FIELD

A hundred and twenty-five friends and associates of Frederick E. Atteaux, president of T. E. Atteaux & Co., Inc., Boston, Mass., and of the Palatine Aniline & Chemical Company, Poughkeepsie, N. Y., gathered on October 2 at the Algonquin Club, Boston, to do him honor at a complimentary dinner on the fortieth anniversary of his entrance into the dyestuff field.

C. P. Gagnebin acted as toastmaster, and a distinguished list of speakers included E. Mark Sullivan, representing Boston's mayor; Lieutenant Governor Alvan T. Fuller of Massachusetts, former Congressman Joseph A. Conry, Colonel Herman A. Metz, former Mayor John F. Fitzgerald of Boston, and Alan B. Chaflin, who had been chosen to present Mr. Atteaux with a gold cigarette case.

It was first intended that this dinner, which was to include only a few friends, was to have taken place immediately upon the return of Mr. Atteaux from Europe, but the plans were deferred at that time owing to the untimely death of young William Wood, as so many of Mr. Atteaux's friends as well as Mr. Atteaux himself are closely associated with the American Woolen Company.

The dinner was in every way a striking tribute to Mr. Atteaux, and The REPORTER at this time wishes to add its congratulations to the rest, and to extend its best wishes for Mr. Atteaux's continued health and activity.

NOTES ON THE DYEING OF DIRECT BLACKS ON COTTON PIECE GOODS

(*Continued from page* 290.)

fabric thus enters in a first bath, where it takes up dyestuff sufficient to attain a certain intensity of shade; this is then increased to the desired intensity in the following two compartments (B and C). On passing through the respective squeezing cylinders (j, k, l) all excess of dye bath is pressed out, so that very little unfixed coloring matter has to be expelled in the following rinsing operations, conducted in the two last compartments (D and E).

ADVANTAGES OF THE PLANT

The advantages of the plant can be considered as indicated below in their broad outlines:

1. A very large number of pieces of cotton cloth can be dyed in one lot without running the risk of a difference in shade—which is not always the case when dyeing the same color on different jiggers simultaneously, or on the same jigger at different times.

2. Through adding a blank or waste piece of cotton cloth at the end of the last piece to be dyed in the same color, it is possible to start the treatment of a new lot of cotton cloth by simply suspending the coloring matter running in from one of the upper half-tubs (V), allowing the emptying of the three dyeing compartments (A, B, C), giving these a slight rinsing with running water, and running in from the other upper storage tub (W) another quite different dyestuff solution.

3. Through adopting a suitable opening or spreading arrangement before each pair of squeezing rollers, it is possible to avoid the formation of any folds during the coloring and rinsing operations, running the material, when this makes its way out of the plant, directly to the drying cylinders and finishing calender without any intermediate stoppage.

4. The material remains in the dye bath all through the dyeing operations, and short baths can also be adopted when conducting the dyeing at a greater speed.

5. A competent dyer can attend the working of several plants simultaneously, as most of the work is conducted automatically.

(*To be concluded.*)

COLONEL METZ NOMINATED FOR CONGRESS

Col. Herman A. Metz, president of H. A. Metz & Co., Inc., president of the Consolidated Color & Chemical Company and vice-president of the Central Dyestuff & Chemical Company, was nominated for Congress on the Democratic ticket in the 17th Congressional District in the City of New York in the primaries of September 20.

Colonel Metz was formerly a representative in Congress from the 10th Congressional District of Brooklyn, and made a very enviable record as a member of

the lower House. He was also Comptroller of New York City during Mayor McClellan's administration. Through his efforts the city was placed on a firm financial accounting basis, and the manual of accounting which he established is still used in New York and has been adopted as the standard throughout the United States.

While an American manufacturer with large interests in plants producing a wide range of dyestuffs and pharmaceutical specialties, Colonel Metz has consistently opposed the embargo and is credited with being chiefly responsible for its elimination from the Fordney-McCumber tariff bill.

The Colonel has always favored what he believes to be adequate tariff protection, but has opposed drastic measures which he feels would make it not only difficult but impossible to get those colors not yet available here. He has steadfastly maintained that manufacturers in one group should not be favored at the expense of, and to the disadvantage of, the many industries dependent upon suitable dyestuffs.

A reference to Colonel Metz's candidacy will be found in the editorial columns of this issue, page 293.

WHY SOAP SOLUTIONS BECOME EXHAUSTED

Everyone is familiar with the fact that a soap solution becomes exhausted; that is, rendered unfit for cleansing purposes by passing a considerable quantity of soiled goods through it. For this reason, says Textile, a "second suds" is necessary in washing certain classes of goods. The cause of this exhaustion is easily understood in considering the colloidal adsorption properties of a soap solution.

In the process of adsorption, the soap particles, in a certain sense, leave the solution and attach themselves to the dirt. The soap thus adsorbed does not go back into the water (dispersing phase as it is called) but hangs on to the dirt tenaciously. This is equivalent to taking soap out of the water, or in other words, weakening (diluting) the soap solution. The soap solution, therefore, weakens or becomes more dilute as the adsorption progresses, until all of the soap has been taken out of the water. The suds disappear and the cleansing value is lost.

The cleansing action of soap dissolved in water is summarized as follows:

1. Produces alkali in small quantity;
   (a) To neutralize acid dirt,
   (b) To dissolve albumins.
2. Lowers surface tension;
   (a) To emulsify mineral oils, etc.,
   (b) To rapidly wet or penetrate.
3. Forms suds (emulsion of air);
   (a) To indicate active soap,
   (b) To lubricate and cushion cloth layers,
   (c) To carry oxygen,
   (d) To remove dirt by agitation and buoyancy.
4. Breaks up and carries dirt from cloth (colloidal action);
   (a) Valuable on grease-free and oil-free dirt,
   (b) Stabilizes emulsions and suspensions.

Rival Knitting Company, Inc., 325 Gold Street, Brooklyn, N. Y., has been purchased by Iser P. Cohen and the forty-five knitting machines and other equipment have been removed to the Art Silk Knitting Company, Brooklyn, which also had been purchased by Mr. Cohen. Mr. Cohen's new company will be known as C. B. Knitting Mills, Inc., and have a capital of $100,000 with Mr. Cohen as president and treasurer.

The New Haven Silk Hosiery Company, Fort Wayne, Ind., has been incorporated with a capital of $100,000 by Herman Bowers, Martin Gorain and Bernard Storch, to manufacture silk hosiery.

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By PAUL HEERMANN

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The advertising agency is the precocious infant among the professions. One of the oldest agencies in New York prints on its letterhead the date of its founding, and that date is 1869! Think of it—almost five years after the Civil War; and the boys of the Civil War are still alive among us.

Law traces its ideals and traditions back to Moses; but even Law is not free from missteps. The physician takes his Hippocratic oaths, and Hippocrates lived 400 B. C.

Yet it was only yesterday when doctors discovered that bad teeth can cause anything serious. Is it fair to expect perfection in a profession that counts only a single generation to its credit? Should it occasion surprise when even a well-laid advertising campaign goes wrong? Is it any wonder that workers whose chief raw material is human nature should have to confess that they cannot always tell in advance just how that raw material will act?

We are learning. We have just passed through one great cycle of inflation and deflation. We know now what happens to the automobile business, and the shoe business, and the perfumery business when prices go up like a rocket and come down like a stick. How much wiser counsellors to our customers we shall be when another cycle swings around. How much better we shall be able to read the signs of the storm, having passed through one such tempest.

Do you remember the references in English novels to those old law firms —solicitors—in which sons have succeeded their fathers to the third and fourth generation? Each new generation of lawyers has handled the affairs of the new generation among its clients, dealing out counsel based on records which run back for a hundred years or more. There is no reason why advertising agencies, too, should not outlive their founders and the successors of their founders, growing wiser with each generation and gathering a priceless possession of recorded experience.

Think of an advertising agency in 2020 being able to turn back in the records to 1920 and say to its clients: "In the Fall of 1920 this happened in silk, and this happened in leather, and this happened in wheat, and the selling problems which followed were so and so. The present situation has certain aspects that are similar; and the recommendations which we are presenting are based on a recognition of that fact."

We are gaining experience; we are growing more and more valuable as advisers each year.

Don't expect the impossible.

Give advertising time.

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THE NEWPORT COLORS

Vat Dyes

THE SUN

is the greatest chemist in all the universe, and just as eons ago it instilled into vegetation the elements we now withdraw for the production of color from coal, so is it endowed with the power of destroying these selfsame colors. To the ingenuity of man falls the task of combating this, and as a result of the endeavors of the chemist the famous series known as the

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